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FIFTY-FIRST

ANNUAL REPORT

OF THE

FISHERIES BRANCH

Department of the Naval Service

729C  
FOR THE YEAR

1917

PRINTED BY ORDER OF PARLIAMENT.



OTTAWA

J. DE LABROQUERIE TACHÉ

PRINTER TO THE KING'S MOST EXCELLENT MAJESTY

1918

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*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O.,  
etc., etc., Governor General and Commander in Chief of the Dominion of  
Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-first annual report of the Fisheries Branch of the Department of the Naval Service.

I have the honour to be,

Your Excellency's most obedient servant,

C. C. BALLANTYNE,  
*Minister of the Naval Service.*

DEPARTMENT OF THE NAVAL SERVICE,  
OTTAWA, September, 1918.

*ERRATA.*

Page 26, last paragraph, should read:—"There were 95,122 persons engaged in the various branches of the fishing industry afloat and ashore during 1917, Of the total, 84,011 were engaged in the sea fisheries, 11,111 in the inland fisheries. There were 8,946 on vessels, tugs, and smacks; 62,700 in boats; 744 fishing without boats; and 22,732 working in canneries, freezers, smokehouses, etc., cleaning and preparing the fish for market."

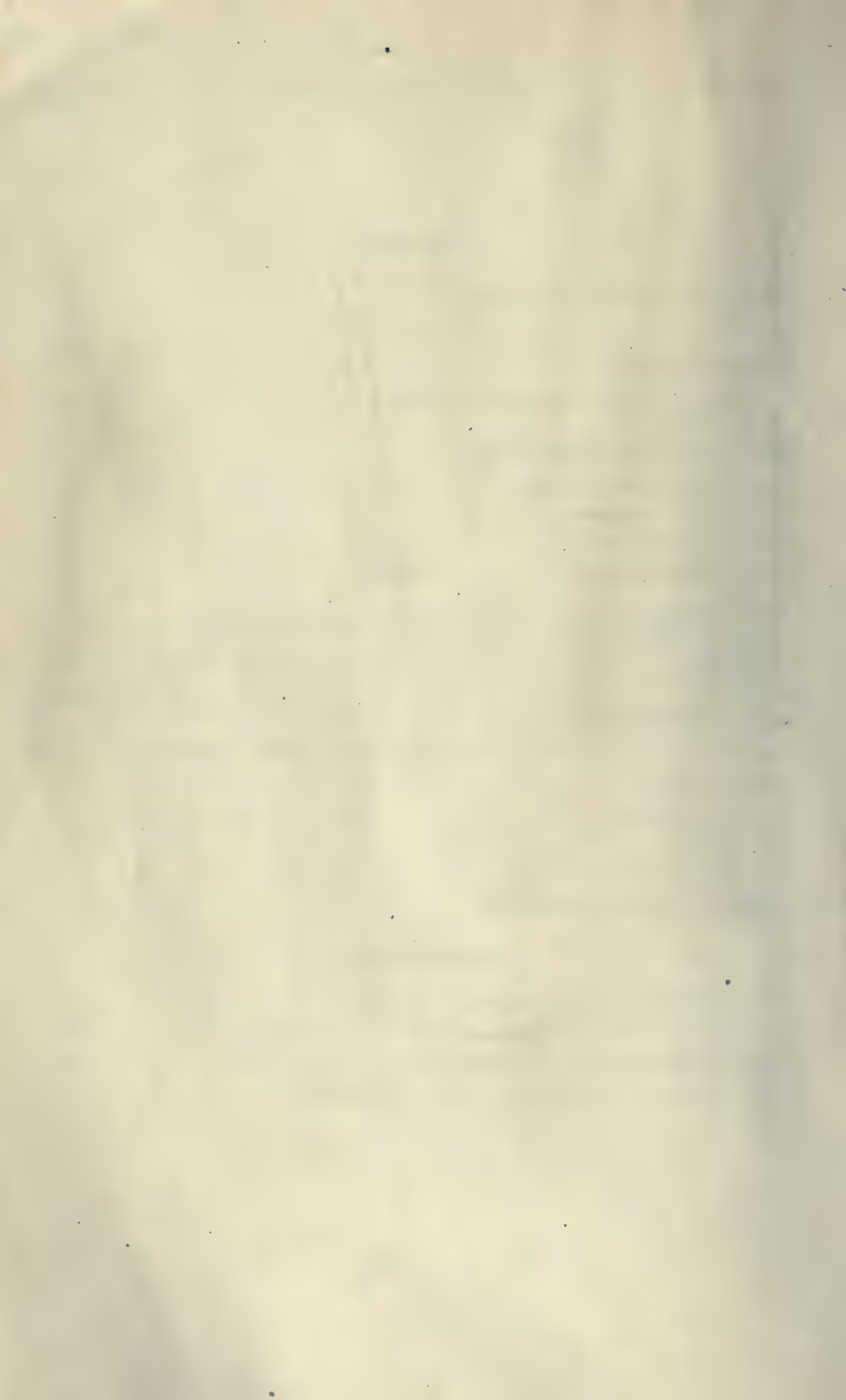
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## DEPUTY MINISTER'S REPORT.

To the Honourable C. C. BALLANTYNE,  
Minister of the Naval Service.

SIR,—I have the honour to submit the fifty-first annual report of the Fisheries Branch of the Department of the Naval Service, which deals with (a) international questions and the investigation of the British Columbia salmon fisheries by special commission; (b) the various activities of the Branch; and (c) the production and value of the fisheries.

### INTERNATIONAL QUESTIONS.

#### GENERAL.

For some years past, negotiations have been in progress with the United States for the settlement of certain outstanding fishery questions.

Ever since the American Revolution, the question of port, inshore, and onshore privileges to United States fishing vessels in Canadian waters and territory, has been a contentious subject, and at times it threatened the peaceful relations of the two countries.

This question was last dealt with in a permanent way by the Treaty of October 20, 1818, one hundred years ago. It soon afterwards developed that the two countries placed different interpretations upon the meaning of certain of its terms, and the question of the true meaning of such terms was not settled until 1910, when it formed the subject of an arbitration at the Hague. There had always been a disposition to exchange an extension of the privileges to United States fishing vessels in our waters for free access for Canadian fish to the United States markets. Provisions of this character were included in the Reciprocity Treaty of 1854 and in the Treaty of Washington of 1871.

In view of this, the United States Government, in 1914, following the removal of the duty on fresh and unmanufactured fish going into that country, requested an extension of the privileges to their fishing vessels in Canadian waters.

On the other hand, Canadian fishing vessels were not being allowed to go to United States ports with their catches direct from the fishing grounds, and if they found themselves there for any reason they were not given clearances back to the fishing grounds, but had to clear for a port in an outside country. Hence the removal of the duty was being largely nullified to them.

Also, with a view to properly protecting her lobster fishery, Canada maintains a close season for fishing lobsters, during which Canadian fishermen are not permitted to fish either inside or outside Canadian territorial waters. But during the closed time along the southwestern coast of Nova Scotia, United States well-smacks have for years past been coming over and fishing outside territorial waters, and using our harbours at nights for shelter. This practice, Canada felt was a violation of the spirit and intention of the Treaty of 1818, and the fishing was not only causing great unrest amongst our local fishermen, but was in a large measure nullifying the good effects of our close season.

Negotiations had been proceeding during the past two years for a settlement of these matters, but with no definite result.

Meantime a difficult and rather critical condition was developing on the Pacific coast. Since 1897 Canada has been granting special privileges to United States fishing vessels coming to British Columbia ports with their catches, by which they were enabled to ship their fish in bond to the United States. Following the completion of the Grand Trunk Pacific, these privileges were extended so as to allow vessels to sell their catches in bond to some duly authorized person or firm, who would in turn ship them in bond to the United States, thus enabling small vessels that did not land carload quantities, or that had not selling facilities in the Eastern States to avail themselves of the Canadian ports. As Prince Rupert is much nearer the fishing grounds than Seattle, most of the vessels from that port began to resort to the former to dispose of their catches. This caused great unrest and agitation in Seattle and in Ketchikan, Alaska, and last year a Bill was introduced into Congress which had for its object the preventing of any Pacific-caught fish being shipped into the United States through Canada, unless the consignments of such originated in a United States port. Representations were made by Canada against the adoption of this Bill and, while it passed through the initial stages, it was finally defeated, but notice was given that it would be again introduced at the following session of Congress. After protracted negotiations, Canada finally offered to settle the whole matter on both coasts on the following basis:—

1. That the *modus vivendi* be extended to all fishing vessels, by whatever means they may be propelled, that it be applied to the Pacific Coast as well as to the Atlantic, and that the annual fee be reduced from one dollar and fifty cents per registered ton to the nominal sum of one dollar per vessel. Also, that the renewal of the licenses from year to year be not conditional on an Order in Council, but form part of the arrangement itself.
2. That United States fishing vessels on both coasts be allowed to sell their fish in Canadian ports for the Canadian markets, subject to Customs duty, as well as to sell in bond.
3. That Canadian fishing vessels be allowed to purchase bait in United States ports or waters, on equal terms with American fishing vessels.
4. That Canadian fishing vessels be allowed to take their catches to United States ports and sell them there, subject to Customs duties, if any.
5. That fishing vessels of either country visiting ports in the other, be given clearances for the fishing grounds, if so desired.
6. That the United States prevent American lobster well-smacks from fishing off the Canadian coasts during the close seasons for lobster fishing on such coasts.
7. That such arrangement be in force until the expiration of two years after either party thereto shall give notice to the other of its wish to terminate the same.

Following receipt of these proposals the United States asked for the appointment of a Joint Commission to fully consider the whole matter. This was agreed to, and a commission consisting on the United States side of Hon. W. C. Redfield, Secretary of Commerce, Hon. E. F. Sweet, Assistant Secretary of Commerce, and Dr. H. M. Smith, Commissioner of Fisheries; and, on the Canadian side, of Hon. J. D. Hazen, Chief Justice for New Brunswick, (but who was Minister of this department while the negotiations were going on), W. A. Found, Superintendent of Fisheries, and the undersigned. Two other highly important questions—the rehabilitation and production of the sockeye fishery of the Fraser river system, and the protection of the halibut fishery of the Pacific coast—which were under consideration between the two Governments, were also referred to the commission. As the conditions of these two fisheries and the causes of the decline therein have been dealt with in recent annual reports, it is unnecessary to go into details of them herein.

The commission met at Washington on the 16th of January, and continued in session there until the 24th of that month. While substantial progress was made at these sittings, it was found to be desirable to hold some public sittings on both the Atlantic and Pacific coasts before reaching decisions. Such sittings were held in Boston and Gloucester, Mass., and St. John, N.B., from January 31, to February 6, both days inclusive. The commission then adjourned to meet

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at Seattle, Wash., on April 24, next. Following the return to Washington and Ottawa, respectively, of the two sections of the commission, they took up with their Governments the question of a temporary arrangement during the war to meet the difficulties in connection with privileges to the fishing vessels of either country in the ports of the other, with the object of removing every barrier to the greatest production of food and the freest movement thereof. On the 21st February the United States Secretary of Commerce, with the authority of the President, sent the following notice to the United States Collectors of Customs:—

To promote the vigorous prosecution of the war and to make the utmost use jointly of all the resources of the nations now co-operating you will permit, during the war, Canadian fishing vessels and those of other nations now acting with the United States to enter from and clear for the high seas and the fisheries, disposing of their catch and taking on supplies, stores, etc., under supervision as in the case of merchant vessels entering and clearing for foreign ports, except as to tonnage tax and other charges specifically imposed on entry from and clearance for foreign ports.

On the 8th March an Order in Council in the following terms was approved:—

The Minister of the Naval Service recommends, under the authority of the War Measures Act, chapter 2 of the Statutes of 1914, that during the war, United States fishing vessels, in addition to their treaty rights and privileges, shall be permitted to enter any port in Canada, without the requirement of a license, or the payment of fees not charged to Canadian fishing vessels, for any of the following purposes:

(a) The purchase of bait, ice, nets, lines, coal, oil, provisions and all other supplies and outfits used by fishing vessels whether the same are of a like character to those named in this section or not;

(b) Repairing fishing implements;

(c) Dressing and salting their catches on board ship;

(d) The shipping of crews;

(e) The transshipment of their catches;

(f) The sale thereof locally on payment of the duty.

The Minister further recommends that the fees paid on licenses already taken out for the present calendar year be remitted.

Thus for the term of the war this troublesome question has been fully and satisfactorily settled.

Also during the time that the commission was in Washington, the Secretary of Commerce gave instructions to have a Bill prepared for immediate introduction into Congress to prevent the continuance of United States lobster well-smacks coming over to the Canadian coast and fishing lobsters outside territorial waters during the Canadian close season there.

It is anticipated that the commission will complete its investigations and submit its report during the coming summer.

## FUR-SEAL FISHERY.

Under the Pelagic Sealing Treaty of 1911, between Great Britain, the United States, Japan, and Russia, pelagic sealing, or the killing of fur seals at sea, is prohibited—excepting to the extent that such may be done by the Indians or other aborigines along the coast, using canoes—for a term of at least fifteen years, and during this period Canada is to receive 15 per cent gross in number and quality of the seal skins taken on the United States and Russian seal islands, and 10 per cent of those taken on the Japanese islands.

As the herds were so very seriously depleted when the treaty became effective, the year following, both the United States and Russia stopped all commercial killing on their islands for five years, so that commercial killing will begin in both countries in 1918.

In early years, before pelagic sealing became important, the United States islands readily yielded one hundred thousand fur seal-skins annually without

showing any ill effects on the herds, but in 1911, when the treaty came into effect, the total number of seals resorting to these islands was estimated at 123,600.

The increase during the past five years has been very satisfactory. A careful census taken in 1917 showed the presence of 468,692 seals on the islands.

As seals are born in about equal numbers as regards sex, and as they are highly polygamous, a large percentage of the young male seals may be killed each year, not only without detriment, but with absolute advantage to the seals. It is probable that from 20,000 to 30,000 such seals will be killed on these islands during the coming summer.

It has not been possible to procure much information regarding the conditions on the Russian Islands, but the total number of seals on these islands in 1917 was given as 15,000, and it was proposed to kill 750 during the summer of 1918.

The Japanese rookeries are quite small. They are now practically restricted to those on Robben island, which was ceded to Japan by Russia at the close of the Russo-Japanese war. Small killings went on, on these rookeries since 1911, with the exception of 1916 and 1917. Canada's share for the years 1912, 1913, and 1914, amounted in the aggregate to 123 skins. These were recently sent by Japan with her own share to St. Louis, U.S.A., to be sold at the fur sales there in April, 1918. Canada's share of the skins taken in 1915 amounted to 58. These were forwarded to Messrs. C. M. Lampson and Company, of London, during the present year, and will be sold in the April, 1919, sales.

While the number of seals reaching the island in 1916 and 1917 during the killing season was small, the census taken in the latter year showed that during the three months beginning with the 1st of August, 10,515 seals resorted to the islands. This is an eminently good showing, and is clear evidence that the rookeries will be in excellent condition in a few years.

Unless unforeseen conditions prevail, Canada will, beginning with 1918, receive an important revenue from its interest in the seal herds, the amount of which will rapidly grow from year to year as the sizes of the different herds increase.

### SPECIAL COMMISSION TO INVESTIGATE THE SALMON FISHERIES OF DISTRICT NO. 2, BRITISH COLUMBIA.

The administration of the salmon fisheries of British Columbia, so as to enable the industry to be carried on to the greatest public advantage, and at the same time to afford the different species of salmon the protection necessary to maintain the runs thereof at a maximum of productivity, involves some of the most difficult and perplexing problems with which the department has to deal. Also, until the Privy Council decision in the Fisheries reference, in 1913, the question of right as between the Province and the Dominion was not fully defined, and dual jurisdiction prevailed, which added to the difficulties of the situation.

For several years the number of salmon canneries in district No. 2—that portion of the province north of cape Caution—was restricted to a given number. The number of fishing licenses in the different areas was also, and still is, limited to that which investigations have shown the fisheries could safely stand, and these licenses were definitely allotted to the different canneries.

Some years ago it was decided that a departure from this policy was desirable, and accordingly licenses for some additional canneries were granted, and a number of the fishing licenses in each area were issued to *bona fide* white fishermen as unattached or independent of any cannery.

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After much consideration it was decided in 1917 that the time had arrived when all the fishing licenses should be issued independently of the canneries, and that restriction of the number of canneries to be allowed should be removed. Accordingly those engaging in the industry were notified that this would be done beginning with the season of 1917.

Following announcement of this decision, nearly all the canners interested interposed the most strenuous objection. They maintained that if this course were followed it would jeopardize the future of the industry, and in a few years it would be in a state of bankruptcy and chaos, when the position of the fishermen themselves would be much worse than at the present time. They expressed confidence that while the proposed policy might seem proper in theory, if the real state of the business end of the industry were fully understood, the department would not advise such a course, and they asked for a thorough investigation by a commission consisting of absolutely disinterested business men. It was decided to grant this request, and a commission consisting of Mr. W. Sanford Evans, as chairman, Mr. H. B. Thompson, now chairman of the Canada Food Board, and Mr. F. T. James, of the F. T. James Company, Limited, Toronto, was appointed.

The commission was asked to investigate and submit findings on the following points:—

1. Whether the number of salmon canneries allowed to be operated in District No. 2, British Columbia, should be restricted to the number of licenses for such establishments as are now effective, and if so, for what length of time.
2. Whether motor boats should be allowed to be used in salmon fishing operations in the said district.
3. Whether the number of fishing boats now allowed to be used in any area should be enlarged or reduced: (a) if motor boats are allowed, and (b) if row boats only are permitted, and if so, by how many in either case and in either direction.
4. Whether any of the boats authorized to be used in any area should be licensed to fish in connection with specified canneries only, and if so, what proportion of such boats.
5. Whether the export in a fresh condition of other varieties of salmon than sockeye should be prohibited, and if so, to what extent.
6. The actual amount of money in cash originally and at present invested in each cannery and equipment; the annual business done and the expenses connected therewith and the gross and net annual profits or losses sustained by each cannery in the said district since the boat-rating became effective, such information to be obtained by the examination of witnesses under oath, or by an audit of the books, or both, as may be found most desirable by the commissioners.
7. Such other points directly connected with the salmon fishing and canning industries in this district as in the opinion of the commissioners will better enable them to reach proper conclusions on the aforesaid subjects.

They investigated the matter very thoroughly during the past summer, and visited every area in which fishing was carried on.

As the commission submitted its report to you a few days before the end of the fiscal year, and as it is being printed for public use, it is unnecessary to comment on it herein.

## CHANGE IN STATISTICAL YEAR.

Heretofore the twelve months period covered by the annual report on the fisheries was that of the fiscal year, extending from 1st of April to 31st of March following. But as the great bulk of the annual catch is landed during the spring, summer, and fall months—operations during January, February, and March being on a more limited scale—it was decided, since the last report was published, that the year for statistical purposes should, in future, be the calendar year. Consequently, the twelve months now being reported on are those from January to December, 1917.

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The figures for the first three months of the year were, of course, included in the last report and are repeated in this one in order that a full calendar year may be covered at the beginning for future comparative purposes.

### CHANGE IN METHOD OF PUBLISHING REPORT.

There has also to be noted a change in the method of publishing the annual report. Under an arrangement for statistical co-operation between this department and the Dominion Bureau of Statistics, the latter will publish as a joint report the usual details of production by counties and districts, as Part III of its Census of Industry, under the title "Fisheries Statistics of Canada." The statistical information, however, is collected by our fishery officers and checked in this department, as before. It is then handed over to the Bureau of Statistics for publication. This report, therefore, contains a summary only of the production and value of the fisheries for the period named.

### DEPARTMENTAL ACTIVITIES.

#### CONTROLLING AND PROTECTING THE FISHERIES.

To afford adequate protection to the fisheries that require such is, unfortunately, still a difficult and expensive matter. The vast extent of our country, its comparatively sparse population, the great number of rivers and streams up which anadromous sea fish ascend to spawn, many of these being in practically uninhabited portions of the country, the high prices and ready demand for the different species of fish and shell-fish most needing protection, all add to the difficulty of fully enforcing provident and necessary regulations. As the department's outside organization becomes more efficient and stronger, and as public sentiment against infractions of the fishery laws grows more emphatic, it is hoped that the department's work in this respect will become lighter.

No one is permitted to engage in most of the fisheries that will admit of only limited prosecution, unless he first procures from the department a fishery license. Up to the present the fisheries have not been regarded as an industry from which much direct revenue should be procured, hence the license fees are usually nominal as compared with the value of the concessions. During the present year a total number of 26,565 licenses were issued.

To see to the enforcement of the license provisions and the other laws and regulations designed to afford the various fisheries necessary protection, the fisheries branch has an outside organization consisting of chief inspectors, inspectors, overseers, and guardians, as well as a fleet of patrol boats to supervise waters that cannot be efficiently controlled from the land alone.

The first three named classes of officers are permanently employed, but the guardians are engaged only during such times as the overseers need special assistance. During the present year the numbers of officers and patrol boats in the different provinces were as follows:—

Province.	Chief Inspectors	Inspectors.	Overseers.	Guardians.	Patrol Boats.
British Columbia.....	1	3	20	30	20
Alberta and Saskatchewan.....	1	2	8	52	..
Manitoba.....	..	2	3	18	1
Quebec.....	..	1	12	1	2
New Brunswick.....	..	3	29	167	6
Nova Scotia.....	..	3	59	457	7
Prince Edward Island.....	..	1	4	87	3
Yukon.....	..	1	..	..	..

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The organization in the eastern provinces is, in most portions thereof, inefficient. The number of officers is unduly large, but they are paid mere pittance, so that it is unreasonable to expect that they can devote to their fishery duties the time necessary for their proper performance. It is essential that a complete reorganization of this portion of the service should be effected without avoidable delay.

But while this class of work is of the utmost importance, and is very exacting on time, the affirmative side—the doing of things to increase the knowledge of the fishermen in the life-history of fish, to enable them to catch more fish, to prevent them losing valuable time unnecessarily, to encourage the better handling of fish so that fishermen will get more for their catches and consumers will receive a better article of food, to provide better facilities and cheap transportation rates for fish, to bring to the attention of the general public the value and comparative cheapness of fish as food, the keeping up and increasing the supplies of certain kinds of fish by artificial hatching and rearing, etc.,—has during this year received a full share of attention.

## TRANSPORTATION OF FRESH FISH.

The assistance in affording better transportation facilities and cheaper rates for fish, that has been in operation for a number of years past, has been continued with some modification during this year. This work was started in 1907, and has proved one of the most helpful of the department's activities. Indeed such success has been met with, that the object in view—placing the fish business in a position where it can take care of itself—has been almost accomplished, so that the time is drawing near when it will be unnecessary for the department to bear any portion of the transportation charges on fish, but it will be always its duty and pleasure to aid in every feasible way in securing more adequate transportation facilities. Important as cheap rates are, proper facilities are even more important.

When this service was first undertaken, the shipments of fresh, mildly cured, and fresh frozen fish from the Atlantic coast, were so small that the railways did not find it feasible to place refrigerator cars, even to be hauled by freight, at the disposal of the dealers. There were no refrigerator express cars for fish, and the rates by the ordinary express cars were so high as, under the conditions then obtaining, to preclude the possibility of rapidly expanding the demand in the larger centres of consumption. Moreover, meat was then plentiful and cheap in all parts of the country, and as meat is less perishable and easier to handle than fish, it was extremely difficult to compete against it. Another great obstacle in Canada that does not obtain even in the United States is that, at least on the Atlantic coast, we have no large cities, and even on the Pacific coast there is but one. Montreal, the nearest one to the Atlantic, is nearly one thousand miles from the main shipping points in Nova Scotia.

In 1907 the department arranged for a limited refrigerator fast-freight service from Halifax and Mulgrave to Montreal, and the following year it undertook responsibility for the payment of one-third of the express charges on L.C.L. shipments from the Atlantic coast to points in Quebec and Ontario, and with a view to working up a demand in the Prairie provinces, a similar payment was authorized on shipments from the Pacific coast to such provinces.

Good effects immediately became manifest, and it affords the department the keenest pleasure to testify to the energy of the wholesale dealers and the larger producers, and to the cordial manner in which they co-operated with it and with each other to bring about the best results. Also the Canadian Government Railway and Express Companies, though unable to afford lower rates, have been doing everything they found to be feasible to encourage the business.

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Experience shows that the needs of the business would be best served by a frequent express service by refrigerator cars, and year by year efforts were made to bring this about. Experiments in a limited express refrigerator service were made on different occasions, but sufficient cars of proper construction have not been available to the express companies. Moreover, the railways have not found it practicable to load their passenger trains, on which the express cars are hauled, to a greater extent than they have been doing. When the time comes that the mails and express packages will be of sufficient volume to require handling by separate trains, the difficulty of express refrigerator car shipments will, no doubt, be largely overcome. Meantime, the extension of the refrigerator fast-freight service, to be operated on schedule time, so far at least as the Atlantic coast is concerned, seems to offer the best solution of the problem for through shipments. Fish forwarded by such service reach their destination in better condition than consignments shipped in ordinary express cars. Hence, arrangements have been made with the railway to have a refrigerator fast-freight service made available to the shippers from the Atlantic coast three days each week, and the department looks forward to the time when this will be a daily service, operated on schedule time, so that it will be to all intents and purposes an express service at freight rates. It also hopes that it will be found feasible to extend this service at least to Toronto.

The growth of the business from the time the department first arranged for improved transportation facilities has been rapid, and, with the exception of the first two years of the war, continuous. The progress, that was made in the earlier years of such assistance in the different branches of the industry, made it possible for the producers and dealers to take advantage, to a much greater extent than would otherwise have been possible, of the opportunities that have more recently been arising on all sides.

The Canada Food Board, which was appointed this year, has done its full part in developing the demand for fish. It was not slow to recognize the place that fish could and should occupy in the food of our people, and its powers in controlling the use of different foods place it in a position to do the eminently excellent work it is doing, in making the use of fish much more general. There has been the closest co-operation between the board and this department.

Also the Canadian Fisheries Association has done excellent work in organizing the industry to the extent it has, thus bringing about closer co-operation amongst the different branches thereof. The department trusts that a realization of the benefits of such organization will speedily become general throughout Canada, on the part of the fishermen themselves as well as on that of the larger producers and of the wholesale and retail dealers, so that the association will be able to speak with full authority for all parts of the industry.

On the Pacific coast the industry has been so far largely confined to the salmon, halibut, and herring fisheries, notwithstanding that this coast is rich in other fisheries, and that vast quantities of other excellent edible fish are caught in fishing for halibut, but have been mostly thrown away as caught, on account of the lack of markets for them. The demand for halibut and salmon, both in Canada and the United States, has grown so rapidly in recent years that it is now greater than the supply, so that there is no longer need for the payment of any portion of the transportation charges on these fish.

On the other hand, it is pre-eminently desirable, both from the standpoint of the industry and of the public, that the various species of excellent flounders and so-called "cods" and other fish which can be produced cheaply and abundantly on the Pacific coast, should come into general use. To introduce these fish it is essential that they should be sold to the consumer at low prices. To this end it was decided during the past fall to change the method of assistance in shipments from the Pacific coast by discontinuing the payment of any portion

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of the express charges on halibut and salmon, and to replace such by the payment of two-thirds of the transportation charges on shipments of other fish, whether forwarded by express or freight, or in carload or less than carload lots. With this assistance, and under arrangements made by the Canada Food Board, it became possible to place flounders, cod, etc., on most of the markets of the Prairie Provinces at a retail price of 10 cents per pound. The result has been highly gratifying. Already important shipments are being made from week to week, and it is evident that the time is not far distant when the demand for these fish will be large enough to maintain an important fishing industry for them as such, instead of as a by-product of the halibut fishery. Indeed, already one company has found it feasible to start a steam otter trawler in fishing for flounders, etc.

While it has not been found practicable so far to procure a record of the total weights of the different varieties of fish supplied to the interior markets, the following statement showing the amounts paid by this department as its one-third of the charges on L.C.L. shipments by express, indicates in a measure the growth of the business:—

Year.	From East Coast.	From West Coast.
1909-10.....	\$15,162 20	\$13,541 76
1910-11.....	16,898 13	21,896 73
1911-12.....	19,620 62	35,315 10
1912-13.....	29,969 48	39,277 13
1913-14.....	37,818 85	44,114 47
1914-15.....	26,667 33	34,528 60
1915-16.....	27,122 69	34,872 56
1916-17.....	32,717 73	36,799 80
1917-18.....	49,550 89	46,371 84

As above indicated, this shows only a limited portion of the trade and its growth. By the refrigerator fast-freight service from the Atlantic coast, several carloads are shipped weekly. Also from the Pacific coast a number of carload lots are shipped weekly by express to supply the needs of Toronto, Montreal, and Winnipeg, on which no portion of the transportation charges are paid by this department. In addition to these, throughout the winter large shipments of frozen fish are forwarded from both coasts by ordinary freight.

On the whole, the expansion of the use of fresh, fresh frozen, and mildly cured fish in this country must be regarded as satisfactory, but the expansion that has taken place this year is merely an indication of the possibilities from now on. This country is particularly fortunate to have, at a time like this, fisheries that are second to none in their extent, variety, and abundance. The supply of meat, even before the war, had fallen below the demand. The shortage is now vastly greater apart from the fact that it is imperative that we shall not only export sufficient to meet the requirements of our soldiers overseas, but that we shall do our full part in supplying the needs of the Motherland and our European allies. There seems little room for hope that the meat shortage will be any less when the war ends. Indeed, it is not improbable that the most critical period in the world's food supply will be during the few years succeeding the war. Hence the possibilities for expanding the demand for fish during the next few years are vastly greater than they ever were.

To enable full advantage of these possibilities to be taken, two things are of paramount importance:—

- (1) That the railways and express companies provide adequate transportation facilities at reasonable rates; and

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(2) That the people of this country and of this continent be made to realize that fish that are properly frozen as soon as they are landed, that are shipped in a frozen condition in refrigerator cars and that are sold retail still frozen, without ever having been thawed, are the next best thing to these fish right at the seaside, as they are delivered from the boats or vessels. There is no room for doubt that fish so handled are much superior to the same fish, if shipped in a fresh, unfrozen condition packed on ice, even in refrigerator cars, when laid down in the interior markets. Also such fresh frozen fish can be shipped in perfect condition to any part of this continent that has railway connection. Furthermore, with a demand for frozen fish there need never be times of shortage and superabundance depending on weather conditions on the fishing grounds, as investigations have demonstrated that frozen fish may be held in storage for months without undergoing the slightest deterioration.

In addition to home consumption, large quantities of fresh frozen fish have been shipped overseas this year for use by the Canadian army there, as well as to supply the domestic needs in Great Britain. Even with the high transportation rates across the ocean, these fish cost less laid down in England than it was possible to purchase similar fish produced there.

The rapid growth in the fresh frozen and mild cured fish trade is being reflected in the fishing industry itself. Better equipment, so as to enable larger landings of fish, is being rapidly introduced. The following statement, showing the growing number of motor boats operated by fishermen in recent years, clearly evidences this:—

Year.	Atlantic Coast.	Whole of Canada.
1910-11.....	2,290	4,588
1913-14.....	5,788	8,700
1914-15.....	6,779	9,302
1915-16.....	8,119	11,097
1916-17.....	9,719	12,828
1917.....	10,761	14,823

Also, this year four steam otter trawlers were in operation on the Atlantic coast and one on the Pacific.

As many of our fishermen enlisted for overseas military service, it became evident early in the year that fewer would be engaging in the industry than previously, notwithstanding the importance of producing even much larger quantities of fish. Hence a call was sent out by the department to the fishermen on all parts of the coast to individually make increased effort to produce more fish. That this call was not in vain seems apparent by the fact that the total landings this year were greater than last, notwithstanding that a considerably fewer number of fishermen were engaged, particularly on vessels.

#### POSSIBILITIES FOR EXPANSION OF CURED FISH INDUSTRY.

The opportunities for development of our fisheries are not now only along the line of the fresh, fresh frozen and mildly cured business. The markets of the world for dry cured, pickled, cut and canned fish, are available to Canada to a much greater extent than ever before, owing to conditions brought about by the war. We have the fish in abundance. On account of the proximity of the fishing banks to our coasts, we can produce fish cheaply. All that is needed to assure a full share in the world's markets is that by proper handling, curing and packing we produce an article equal to the best procurable anywhere.

It is eminently in the interests of Canada that her fisheries should be developed as rapidly as possible. There is no branch of production that lends itself more readily to the enrichment of the country than its fisheries. They cost nothing to produce, beyond the fishing equipment and the labour employed. Therefore the exportation of fish operates strongly towards a favourable balance of trade.

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## FISHERIES EXHIBIT AT TORONTO.

With the object of increasing the demand for fish, the department again this year, for the fifth successive time, made a fisheries exhibit at the Canadian National Exhibition at Toronto, and for the third successive year it had operated in connection with the exhibit a first-class fisheries restaurant.

The exhibit was even better than any of the preceding ones. It embraced not only a thoroughly comprehensive exhibit of frozen fish, but of fresh, canned, cured and boneless fish as well. Models of the most modern fishing vessels and equipment were also shown. The fresh fish were attractively displayed in chilled show cases in a manner that should be generally adopted in retail stores. Booklets containing information regarding our fisheries, and how to clean and cook the different kinds of fish were freely distributed to those interested.

The exhibit was an unqualified success, and like the previous ones it was one of the leading features at the fair. For it, as in the previous years, the department was awarded a gold medal.

The restaurant was also a splendid success. A good fish dinner was served for 35 cents. It was operated in the east wing of the Grand Stand building. The room was commodious and airy. About six hundred could be accommodated at one time. During the days when the attendance at the fair was large, the patronage of the restaurant was limited only by its capacity; 38,772 meals were served during the twelve days the restaurant was in operation.

## OYSTER CULTURE.

The officer in charge of this service spent the season in examining and cleaning the public oyster beds so as to increase their productivity, and in assisting those engaging in artificial culture and cultivation by affording them advice, and investigating problems confronting the development of the industry.

For some years past there has been a very large influx of starfish into Richmond bay, Prince Edward Island, the home of the well known Malpeque oyster, and one of the most productive areas in Canada. Until recent years these beds were practically free from starfish or other enemies to the oyster. What the cause of the great inroads of these pests may be is a matter of conjecture, but continuous mopping of the beds to remove them is necessary to prevent them completely over-running the beds.

During the past season a blight was found to have broken out amongst the oysters in Richmond bay, and it soon spread to the beds in all portions of the bay. The department caused immediate investigations to be undertaken by the Biological Board to determine the nature and cause of the blight, and, if possible, to prescribe a remedy. The scientific view is that the oysters are affected by a tubellarian parasite of an undescribed species, similar to that which appeared at times on beds along the coasts of Florida and Connecticut. Science has not yet discovered either the cause or remedy, but experience indicates that it is of comparatively short duration, and disappears entirely after running its course.

It has been suggested that the blight was imported in seed oysters procured in the United States and laid down in the bay by some of those who had undertaken oyster culture there, but so far as this department has been able to ascertain there was not at the time, nor has there been since, any similar blight on the beds, or on those in the vicinity, from which these seed oysters were taken.

Whatever the cause may have been, the outcome is extremely unfortunate, as it seems evident that all the oysters in this magnificent bay, both on the private and public areas, will succumb.

The position of the oyster industry in the Maritime Provinces is an extremely unsatisfactory one. There are in these provinces approximately 10,550 acres of producing natural beds, viz., 5,000 acres in New Brunswick, 4,300 in Prince

Edward Island, and 1,250 in Nova Scotia, but there are tens of thousands of acres around the coasts of these provinces that by proper artificial culture and cultivation could be converted into highly producing oyster areas. Experience in every country where it has been properly tried, shows that oyster farming, though probably somewhat more hazardous, is just as feasible, and usually much more profitable than upland farming. In early years, when the demand for oysters was small, the natural public beds readily yielded all that were needed, but as the demand increased, fishing became more intensive, the beds began to suffer. From time to time the fishing season was curtailed until now it is only about a month or six weeks in the year, but the growing number of fishermen more than offset the shortening of the season, and the beds are now on the verge of commercial exhaustion. Experience, wherever oysters are found, shows that natural beds alone cannot meet the requirements of a growing demand.

As long ago as 1892 the department brought over an expert from England to advise as to the best course to pursue, and his services have since been retained; but under the conditions that have obtained, it has been impossible for him to achieve satisfactory results.

The importance of encouraging private culture and cultivation was years ago realized, and prior to the Privy Council decision in the Fisheries reference, in 1898, a number of leases of areas on which to carry on such operations were granted. Following that decision the provinces claimed that by virtue of it they owned the oyster beds, and therefore that they alone could administer the fishery thereon. The Federal Government took an opposite view, so that neither one nor the other was in a position to grant leases of a satisfactory nature, and nearly all those that had previously been issued were allowed to terminate. Negotiations for some settlement of the whole question of fishery rights as between the Dominion and provinces went on intermittently, but year by year went by without anything definite being accomplished, and meantime the public beds were continuously going down.

Finally in 1910 this department endeavoured to have the deadlock broken by entering into a *modus vivendi* with the provinces by which, pending the settlement of the legal points at issue, the administration of the industry would be placed in its hands on the understanding that if it were ultimately decided that the contention of the provinces were correct, a proper accounting for fees collected would be made to them, and that they would sustain those to whom leases might have been granted, in their holdings. To this, all the provinces were not prepared to agree, but they all expressed a readiness to undertake themselves the administration of the industry, so far as the leasing of private areas is concerned, and the building up of a business in the culture and cultivation of oysters.

In the circumstances the department decided to ask for the necessary legislation to enable this to be done, and in 1910 the Fisheries Act was amended so as to authorize agreements to be entered into with the different Provincial Governments whereby they would be empowered "to grant leases of such areas of the sea coast, bays, inlets, harbours, creeks, rivers, and estuaries of such provinces as the Government of such provinces considers suitable for the cultivation and production of oysters....." Following this legislation, enabling agreements were entered into with the different sea-washed provinces, and it is understood that some leases of areas have been issued in each of the three Maritime Provinces, though outside of New Brunswick little progress has apparently been made.

The provinces, however, were not prepared to take over the administration of the public beds as well, so that the unsatisfactory and indeed largely unworkable condition of dual control still exists. It is clearly in the public interest that this should be ended, and it is hoped that some way of accomplishing this will shortly be found.

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The possibilities of the building up of a very large oyster and other mollusk industry are obvious, but in the initial stages, which must be largely experimental, the most careful guiding and control is essential. Under proper conditions there seems no reason why a business could not be built up that would produce a total annual revenue to those engaging in it that would run into millions of dollars.

## FISHERIES MUSEUM.

The excellent Fisheries Museum, which was being built up in Ottawa, had to be dismantled during the year, as the building used was demolished to give place to a large government office building. As no other suitable building was available, most of the specimens had to be stored. Some have been placed in the Victoria Memorial Museum, which is now being used for parliamentary purposes, and some models of fishing equipment were sent to the commercial exhibit of the Department of Trade and Commerce.

As Canada has fisheries second to none in the world, it is fitting that there should be in the Capital a Fisheries museum that would be equal to the best anywhere. It is hoped that when the days of peace return it will be found feasible to erect a proper building for this purpose.

The curator of the museum, who is also the department's naturalist, has been detailed to assist Dr. A. P. Knight, of the Biological Board, in a study of the natural history of the lobster.

## FISHING BOUNTY.

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels", the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the eastern Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1917, payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton; payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$6.30 each.

To owners of boats measuring not less than 13 feet keel, \$1 per boat.

To boat fishermen, entitled to receive bounty, \$3.85 each.

There were 14,532 bounty claims received, and 14,516 paid. In the preceding year, 13,604 claims were received, and 13,593 paid.

The total amount paid was \$159,893.10, allocated as follows:—

To 812 vessels and their crews \$52,748.20.

To 13,704 boats and their crews \$107,144.90.

The following table shows in detail the payment of the bounty by counties for the year 1917:—

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Provinces and Counties.	Number of Vessels.	Tonnage	Average tonnage.	Number of men.	Amount paid.	Number of Boats.	Number of men.	Amount paid.	Total Bounty paid to Vessels and Boats in 1917.
					\$ cts.			\$ cts.	\$ cts.
Nova Scotia:—				5	31 50	179	293	1,307 05	1,338 55
Annapolis.....	—	—	—	—	—	174	246	1,121 10	1,121 10
Antigonish.....	—	—	—	—	—	4	7	31 70	65 60
Cape Breton.....	17	269	16	90	836 45	498	934	4,094 65	4,931 10
Cumberland.....	1	15	15	3	33 90	4	7	31 70	65 60
Digby.....	12	550	46	99	1,173 70	417	718	3,181 30	4,355 00
Guysborough.....	58	901	16	263	2,560 00	812	1,277	5,726 95	8,286 95
Halifax.....	80	1,253	16	344	3,422 00	1,203	1,651	7,559 60	10,981 60
Inverness.....	26	355	13	127	1,157 20	458	917	3,988 45	6,145 65
Kings.....	4	54	14	16	154 80	52	74	336 90	491 70
Lunenburg.....	165	8,323	50	2,120	21,681 25	686	849	3,955 65	25,636 90
Pictou.....	3	58	19	10	121 15	81	107	492 95	614 10
Queens.....	17	193	11	57	553 60	193	309	1,382 65	1,936 25
Richmond.....	31	816	26	213	2,160 00	498	828	3,685 80	5,845 80
Shelburne.....	45	1,027	23	314	3,007 75	693	1,238	5,459 30	8,467 05
Victoria.....	11	146	13	58	513 50	324	476	2,160 70	2,674 20
Yarmouth.....	26	995	38	288	2,811 65	168	323	1,411 55	4,223 20
Totals.....	496	14,955	30	4,007	40,218 45	6,440	10,247	45,896 30	86,114 75
New Brunswick:—									
Charlotte.....	15	256	17	61	646 60	441	694	3,115 40	3,762 00
Gloucester.....	265	3,759	14	1,074	10,527 45	207	488	2,085 80	12,613 25
Kent.....	10	104	10	21	236 30	29	43	194 55	430 85
North'berland..	4	81	20	17	186 90	6	12	52 20	239 10
Restigouche.....	—	—	—	—	—	6	16	67 60	67 60
St. John.....	4	73	18	11	142 45	48	61	283 10	425 55
Totals.....	298	4,273	14	1,184	11,739 70	737	1,314	5,798 65	17,538 55
Prince Edward Island:—									
Kings.....	2	37	18	7	81 10	507	742	3,364 70	3,445 80
Prince.....	8	114	14	32	315 60	543	1,323	5,654 55	5,970 15
Queens.....	4	46	11	14	134 65	130	279	1,205 00	1,339 65
Totals.....	14	197	14	53	531 35	1,180	2,344	10,224 25	10,755 60
Quebec:—									
Bonaventure.....	1	16	—	3	34 90	970	1,722	7,607 20	7,642 10
Gaspe.....	2	24	12	19	145 35	3,201	6,495	28,257 55	28,402 90
Rimouski.....	—	—	—	—	—	96	137	623 55	623 55
Saguenay.....	1	15	15	10	78 45	1,080	1,974	8,737 40	8,815 85
Totals.....	4	55	14	32	258 70	5,347	10,328	45,225 70	45,484 40
Grand totals.....	812	19,480	24	5,276	52,748 20	13,704	24,233	107,144 90	159,893 10

## FISH CULTURE.

The operations carried on from April 1 to December 31, 1917, were confined almost entirely to the propagation of the commercial food fishes, such as Atlantic salmon and lobsters in the Maritime Provinces, whitefish, lake herring, salmon trout, and pickerel in Ontario and the Prairie Provinces; and Pacific salmon in British Columbia.

The commercial species are practically all distributed as fry on the natural spawning areas, and mainly where the eggs had been collected. A small, but growing percentage is reared to the fingerling size. The purely sporting fishes are hatched in small numbers. After adequate return of the fry has

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been made to waters from which the eggs were obtained, the greater part of the remainder is distributed in publicly controlled waters, on application, while a small proportion is supplied to privately controlled or leased waters on payment of fixed prices and all transportation charges.

Owing to war conditions, no new hatcheries were erected. A shortage of labour, a scarcity of fish in some districts, and unfavourable weather conditions in others, resulted in a decreased collection of eggs, and in the hatcheries not all being filled to capacity.

There are fifty hatcheries, fourteen of which are lobster hatcheries. There are also eleven subsidiary hatcheries, six salmon retaining ponds, and one lobster-pound in operation. From these the total distribution of the various species in each province during the season of 1917 was as follows:—

Nova Scotia—	
Atlantic salmon.....	7,176,650
Speckled trout.....	203,400
Lobsters.....	304,589,956
New Brunswick—	
Atlantic salmon.....	10,333,255
Speckled trout.....	106,401
Ouananiche salmon.....	580
Rainbow trout.....	8,000
Shad.....	400,000
Lobsters.....	138,987,000
Prince Edward Island—	
Atlantic salmon.....	1,000,000
Speckled trout.....	241,400
Lobsters.....	108,000,000
Quebec—	
Atlantic salmon.....	6,385,825
Speckled trout.....	164,690
Ouananiche salmon.....	10,000
Lobsters.....	63,220,000
Ontario—	
Speckled trout.....	500
Herring.....	55,850,000
Pickeral.....	169,000,000
Salmon trout.....	32,405,170
Whitefish.....	177,535,000
Manitoba—	
Pickeral.....	15,824,000
Whitefish.....	277,100,000
Saskatchewan—	
Whitefish.....	42,497,000
Alberta—	
Atlantic salmon.....	103,849
Cutthroat trout.....	374,527
Lake herring.....	2,189,000
Salmon trout.....	281,114
British Columbia—	
Atlantic salmon.....	245,050
Speckled trout.....	137,965
Coho salmon.....	2,542,210
Cutthroat trout.....	493,201
Dog salmon.....	4,988,600
Kamloops trout.....	653,453
Rainbow trout.....	16,200
Sockeye salmon.....	73,142,820
Spring salmon.....	3,249,540
Steelhead salmon.....	26,304
Total distribution.....	1,499,482,660

The department is indebted to the United States Bureau of Fisheries for a present of 10,000,000 sockeye eggs from Alaska. The eggs were placed

in a British Columbia hatchery, and the fry will be distributed in the Fraser river.

Evidence of the most satisfactory results from the department's fish cultural operations is apparent on all sides. The catch of whitefish per net in lake Winnipeg was never better than during the current season. The fishery for whitefish in lake Erie, the greatest whitefish-producing area in Canada, and in lake Ontario, tends rapidly towards the prosperous condition in which it formerly was. The salmon rivers of Quebec and the Maritime Provinces were never in better condition; the spawning areas are covered with salmon which are forcing their way into the highest tributaries of the various rivers.

Similar results are not apparent from the lobster hatcheries. Indeed, there is not satisfactory evidence to show that they are even proving beneficial. Hence it has been decided not to operate them during the year 1919.

A detailed report on the fish cultural operations of the department is being published separately in pamphlet form.

#### BIOLOGICAL STATIONS.

The Atlantic and Pacific biological stations carried on their work actively during the season of 1917.

At St. Andrews, N.B., investigations of a practical and scientific nature were conducted by representatives of the various universities of Canada. One of the chief aims of the researches was to investigate the kinds of fish and marine animals that could be used for food, but have hitherto been neglected. The reports on the investigations, when completed, should be of much practical value.

In connection with the work at St. Andrews, a survey of the fisheries conditions in the eastern part of the gulf of St. Lawrence was undertaken from Eastern harbour in Cape Breton as a base.

For three months the staff, under Dr. A. G. Huntsman, made constant trips over the fishing grounds and accumulated a large mass of observations. Much attention was devoted to the spawning of herring at the Magdalen islands, and the drift of the larvæ; also to hydrographic and plankton studies in sections of water between cape Breton and the Magdalen islands, and from Aspy bay out to a depth of 200 fathoms.

Dr. Knight, of Queens University, carried out an important investigation at Caribou harbour, Nova Scotia, in continuation of his lobster researches.

The pearly fresh-water mussel resources of Ontario were studied, and a report made thereon, which has been published.

At Nanaimo, B.C., work was carried on under the supervision of Dr. C. McLean Fraser, curator of the Pacific coast station. Studies of the life-history of British Columbia salmon were continued and results published in the form of special reports. The marking of salmon was also continued; while the study of fish parasites, hydroids, and a great variety of marine animals was completed.

#### FISH INSPECTION.

The season of 1917 was the third in which inspection of pickled fish was carried on. There were presented for inspection and the brand, 8,977 barrels of herring, alewives, and mackerel. Of these, 3,083 barrels failed to pass inspection because of either the poor condition of the fish, bad grading, or inferior barrels. In the preceding year, 7,213 barrels were inspected, while in the year before that, which was the first, there were 1,328 barrels presented for inspection. The number of packers who submitted their fish for inspection was eighty, against seventy-three in the season of 1916 and sixteen in that of 1915.

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The Inspection Act compels no one to submit either his barrels or fish for inspection, and, therefore, results are dependent on the educative and persuasive efforts of the department, through its inspecting officers. During the season, and prior to its opening, fishermen and packers were visited regularly, and the requirements of the Act, with respect to the manner in which their fish should be cured, pointed out to them. Coopers' shops also were visited, and practical instruction in barrel making given to the coopers. Further, simply worded pamphlets of instruction in barrel making and herring curing in the Scotch method were published by the department early in the year, and copies distributed by the inspecting officers.

Keeping in mind the fact that inspection is entirely voluntary on the part of packers and that the carrying out of such often involves them in a considerable amount of extra labour, it affords a considerable amount of satisfaction to be able to show that more packers presented their fish for inspection, and that more fish were inspected, than in the two preceding years.

Much good work has been accomplished since the passing of the Act, especially in connection with the adoption of a higher grade barrel. Many coopers, however, persist in making barrels as of old. This is encouraged to some extent by a certain class of packer who considers only the few cents he wrongly thinks he saves by buying the cheaper, poor barrel, and will doubtless continue so long as our officers are without the power to enforce the production of a standard package.

The present abnormal demand for pickled fish in the United States, due to lack of supplies from Europe, made it possible, in the course of the year under review, to dispose of fish of indifferent cure, packed in inferior barrels, at prices which seemed high compared with those of normal times. For this reason many packers were hard to convince of the necessity for exercising greater care and producing a first-class article, notwithstanding that properly cured fish packed in good barrels in every case secured a better price than the other kind. For example, while some packers obtained \$7 to \$8 for split herring, and \$10, \$12, \$13, and even up to \$15 per barrel on the spot for herring cured in the Scotch style, others who carefully followed the department's instructions got \$20 and up to \$22 per barrel.

## CANNERY INSPECTION.

Under authority of the Meat and Canned Foods Act, all establishments in which fish of various kinds are canned were systematically inspected during the season of 1917. The inspections were undertaken on both coasts by the department's fishery overseers.

The duties of the inspecting officers, as in the past, consisted of supervising the sanitary conditions of each canning establishment, and the utensils used therein; the cleanliness of the employees; the condition of the fish previous to canning; and the manner in which the product is handled.

During the year there were in operation on the Atlantic coast 660 establishments canning lobsters, and 18 canning other fish such as sardines, herring, haddock, mackerel, and clams, while on the Pacific coast there were 93 salmon canneries operated; making a grand total of 771. The total number of inspections made and reported on was 2,364.

In the course of the year the Meat and Canned Foods Act was amended to enable the department to deal more effectively with the canning of fish. Regulations for carrying out the provisions of the amended Act have been framed and adopted, but these will not come into effect till December 15, 1918.

## BAIT-REPORTING SERVICE.

To assist masters of fishing vessels to locate bait supplies during the cod-fishing season, and minimize the time lost in searching from harbour to harbour for bait, there has been in operation, since the season of 1913, a system by which definite information as to the amount of bait landed along certain stretches of the Atlantic seaboard is collected by the local officer of the department and despatched daily by telegram to certain important points, and there posted up.

During the season of 1917 the service was carried on as usual. Each telegram contained definite information as to bait supplies at all important points within the district of the officer who sent the message. Copies of all telegrams were mailed to the department at the end of each week, and the work closely followed and checked.

During the spring months of 1917, 100 telegrams were sent from the Magdalen islands, Souris, P.E.I., and Queensport, N.S., to Canso, Halifax, Lunenburg, and Riverport, N.S.

During July and August, 203 telegrams were sent from Little Bras d'Or, L'Ardoise, Canso, Wine Harbour, and Musquodoboit Harbour, N.S., to North Sydney, Canso, Halifax, Lunenburg, and Shelburne, N.S.; also from Lockeport, N.S., to Canso and Halifax, N.S., and from Shag Harbour and Digby, N.S., to Halifax, Shelburne, and Lockeport, N.S.

From the beginning of September to the middle of November, 46 telegrams, covering information from the counties of Charlotte and St. John, N.B., were sent from Campobello, N.B., to Digby, Yarmouth, Pubnico, and Clark's Harbour, N.S.

This service is being appreciated more and more from year to year, and those in the trade who are interested in the landings of herring, either for bait or food purposes, find that the information furnished is of much benefit to them.

## STATISTICAL WORK.

The system in operation by which the statistical information concerning the sea fisheries is collected and compiled, may be described briefly as follows: Each overseer in the course of his rounds gathers from fishermen and fish merchants, details of the quantity and value of fish landed in his district during the current month. From outlying points that cannot be visited with sufficient frequency by the overseer, the information is supplied to him by a local correspondent.

The information thus collected is despatched to Ottawa on a special form, during the first days of each succeeding month. A copy is sent, at the same time, to the Inspector of Fisheries under whose jurisdiction the overseer is, in order that he may follow and check the work of collection.

At Ottawa the monthly returns are checked and compiled to show the totals for each county, for each province, and for the whole of Canada. This information is published monthly in the form of a bulletin, which also contains summarized results of the fisheries in the United States, Newfoundland, the United Kingdom, Norway, and, prior to the outbreak of war, Germany.

At the end of the fishing season, or at the end of the statistical year, before making up his annual returns, each overseer, in inland as well as in sea-fishing districts, visits all parts of his district and obtains more complete information as to the year's catch and its disposal in a fresh, dried, smoked, etc., state. This information reaches the department through the inspectors of fisheries, who check and compile the figures for their respective districts. In the department the figures are again checked. The fuller information is then published in the annual report.

A state of complete satisfaction has not yet been reached with the work of collecting our general fisheries statistics. For no matter how perfect the

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system is, nor how closely the figures are scrutinized afterwards, the department must rely largely on the intelligence and honesty of its outside officers for accurate returns. It may be safely stated, however, that since the adoption of the present system, in 1910, our published statistics are sufficiently near the mark to enable any one who studies them intelligently to arrive at accurate conclusions as to the upward or downward trend of any particular fishery.

## EXPENDITURE AND REVENUE.

The total expenditure for all fisheries services, except civil government, for the fiscal year ended March 31, 1918, amounted to \$951,384.32.

The total net fisheries revenue from rents, fines, sales, and license fees, including *modus vivendi* licenses to United States vessels, for the same period amounted to \$118,751.39.

The following is a summary of the sums appropriated and those expended for the various services during 1917-18:—

## FISHERIES EXPENDITURE, 1917-18.

Service.	Appropriation.	Expenditure.
	\$	\$ cts.
Salaries and Disbursements Fishery Officers.....	305,000	267,210 21
Fish Breeding.....	400,000	270,796 95
Fisheries Patrol Service.....	190,000	187,839 47
Cold Storage and Transportation of Fresh Fish.....	125,000	116,578 91
Dog Fish Reduction Works.....	60,000	38,036 74
Canadian Fisheries Museum.....	8,000	4,833 65
Building Fishways and clearing rivers.....	30,000	8,975 39
Legal and Incidental Expenses.....	4,000	2,452 24
Oyster Culture.....	6,000	5,003 18
Customs officers <i>re Modus Vivendi</i> Licenses.....	900	289 65
Fisheries Intelligence Bureau.....	5,000	2,873 45
Toronto Exhibition.....	10,000	9,854 72
Inspection of Canned and Pickled Fish.....	25,000	10,639 76
Marine Biological Board.....	26,000	26,000 00
Totals.....	1,194,900	951,384 32
Fishing Bounty.....	160,000	159,893 10

The following table shows certain items of fisheries expenditure for 1917-18, by provinces; details will be found in the Auditor General's Report under the proper headings:—

Provinces.	Salaries and Disbursements Fishery officers.	Fish Breeding.	Fisheries Patrol Service.	Building Fishways and clearing rivers.	Inspecting Canned and Pickled Fish.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	64,537 48	36,057 56	33,673 94	343 72	5,773 31
Prince Edward Island.....	11,097 11	7,994 24	5,697 91		1,647 80
New Brunswick.....	55,124 91	37,021 69	16,195 61		2,999 71
Quebec.....	7,199 95	19,727 25	42,752 33	42 45	50 00
Ontario.....		69,864 18			
Manitoba.....	13,164 99	28,277 84	18,943 45		
Alberta.....	13,262 62	4,127 81			
Saskatchewan.....	16,959 11	5,732 96			
British Columbia.....	62,259 06	54,359 16	63,510 80	8,589 22	100 00
Yukon Territory.....	1,530 75				
General Account.....	22,074 23	7,634 26	7,065 43	168 94	
Totals.....	267,210 21	270,796 95	187,839 47	8,975 39	10,639 76

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## FISHERIES REVENUE FOR FISCAL YEAR ENDED MARCH 31, 1918.

Provinces.	Amount Collected.	Refunds.	Net Amount.
	\$ cts	\$ cts.	\$ cts.
Ontario.....	2,345 48		2,345 48
Quebec.....	7,664 73		7,664 73
New Brunswick.....	14,439 53	10 00	14,429 53
Nova Scotia.....	6,663 94		6,663 94
Prince Edward Island.....	3,260 26	4 00	3,256 26
Manitoba.....	12,910 65		12,910 65
Saskatchewan.....	3,643 65		3,643 65
Alberta.....	9,777 94	10 00	9,767 94
British Columbia.....	53,665 21	150 00	53,515 21
Yukon.....	375 00		375 00
	114,746 39	174 00	114,572 39
Modus Vivendi Licenses.....	4,387 50	208 50	4,179 00
Grand Total.....			118,751 39

## PRODUCTION AND VALUE OF THE FISHERIES.

## WHOLE OF CANADA.

The marketed value of our fisheries for the year 1917 amounted to \$52,-312,044. This is an increase of \$13,103,666 over the value for the preceding year, which in turn was considerably higher than that for any previously recorded year. To the total the sea fisheries contributed \$47,012,605 and the inland fisheries \$5,299,439.

Each province shows a greater value; but British Columbia with \$6,881,249 more, and Nova Scotia with an increase of \$4,375,417, are mainly responsible for the big increase.

The value of the fishery products of the various provinces in 1917 and the four preceding years may be readily compared by glancing at the following table:—

	1917	1916-17	1915-16	1914-15	1913-14
	\$	\$	\$	\$	\$
British Columbia.....	21,518,595	14,637,346	14,538,320	11,515,086	13,891,398
Nova Scotia.....	14,468,319	10,092,902	9,166,851	7,730,191	8,297,626
New Brunswick.....	6,143,088	5,656,859	4,737,145	4,940,083	4,308,707
Quebec.....	3,414,378	2,991,624	2,076,851	1,924,430	1,850,427
Ontario.....	2,866,419	2,658,993	3,341,182	2,755,291	2,674,685
P. E. Island.....	1,786,310	1,344,179	933,682	1,261,666	1,280,447
Manitoba.....	1,543,288	1,390,002	742,925	849,422	606,272
Saskatchewan.....	320,238	231,946	165,888	132,017	148,602
Alberta.....	184,009	144,317	94,134	86,720	81,319
Yukon.....	67,400	60,210	63,730	69,725	68,265
Totals.....	52,312,044	39,208,378	35,860,708	31,264,631	33,207,748

The price of all kinds of fish was higher than in the preceding year, but the greater total value is not due altogether to that circumstance. The catches of salmon, cod, haddock, pollock, and mackerel were considerably greater. On the other hand, the herring catch was a good deal less, while the lobster catch was slightly less, notwithstanding an extension of the fishing season.

There were 95,198 persons engaged in the various branches of the fishing industry afloat and ashore during 1917. Compared with the preceding year this shows a decrease of 106. Of the total 84,270 were engaged in the sea fisheries and 10,928 in the inland fisheries. There were 8,946 on vessels, tugs, and

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smacks; 62,700 in boats; 744 fishing without boats; and 22,808 working in canneries, freezers, smoke-houses, etc., cleaning and preparing the fish for market.

The amount of capital represented in material such as vessels, boats, fishing gear, and fish-curing establishments is \$37,169,328, of which \$34,062,588 is credited to sea fisheries and \$3,106,740 to inland fisheries.

The fishing industry is somewhat different from other food-producing industries, in that operations are affected not only by weather conditions but by the abundance or scarcity of bait and the erratic and unknown movements of the schools of fish. It is not always the case, therefore, that the employment of a greater number of men and vessels results in a greater production of fish, especially with our present means of capture. For example, the Lunenburg bank fishing fleet of 1917 was the smallest in the past ten years, with the exception of one year, yet the catch was the largest on record. The sardine and large-herring fishery in the Bay of Fundy of 1917 fell far short of that of the preceding year, notwithstanding the operations of fully as much fishing gear and greater preparation for dealing with the catch. Taken as a whole, the operations of our fishermen were successful, from the point of view of quantity taken, as well as remunerative. This will be gathered from the following table which I give to show the relative quantities and values of the chief commercial fishes, returning \$100,000 and upwards, in their order of rank, landed in the whole of Canada during the year under review and the four preceding years:—

	1917	1916-17	1915-16	1914-15	1913-14
Salmon..... cwt.	1,642,740	1,239,668	1,410,769	1,409,828	1,551,411
\$	<b>17,411,029</b>	<b>10,882,431</b>	<b>11,262,381</b>	<b>8,560,386</b>	<b>10,833,713</b>
*Cod..... cwt.	2,302,987	2,026,231	2,152,756	1,820,045	1,664,599
\$	<b>8,281,920</b>	<b>5,449,964</b>	<b>4,459,496</b>	<b>3,886,134</b>	<b>3,387,109</b>
Lobsters..... cwt.	474,871	480,898	445,277	408,816	514,646
\$	<b>5,654,265</b>	<b>5,508,054</b>	<b>4,506,155</b>	<b>4,339,929</b>	<b>4,710,062</b>
Herring..... cwt.	1,481,708	1,751,314	1,894,774	2,118,291	2,484,219
\$	<b>3,693,638</b>	<b>3,050,421</b>	<b>2,906,887</b>	<b>2,735,257</b>	<b>3,173,129</b>
Haddock..... cwt.	712,416	582,028	582,522	566,002	405,633
\$	<b>2,936,719</b>	<b>1,711,271</b>	<b>2,232,022</b>	<b>1,244,840</b>	<b>841,511</b>
Halibut..... cwt.	140,024	142,823	226,151	239,920	256,096
\$	<b>2,066,635</b>	<b>2,263,573</b>	<b>2,261,776</b>	<b>1,793,283</b>	<b>1,036,400</b>
Sardines..... brls.	274,359	315,832	335,794	298,885	141,384
\$	<b>1,910,705</b>	<b>1,481,261</b>	<b>1,229,096</b>	<b>1,349,615</b>	<b>676,668</b>
Mackerel..... cwt.	167,067	156,075	180,990	143,712	215,442
\$	<b>1,333,354</b>	<b>924,746</b>	<b>990,329</b>	<b>826,846</b>	<b>1,280,319</b>
Whitefish..... cwt.	178,838	164,902	153,529	159,894	137,887
\$	<b>1,248,006</b>	<b>1,135,486</b>	<b>1,048,641</b>	<b>975,685</b>	<b>929,962</b>
Smelts..... cwt.	73,153	68,629	67,067	93,771	88,728
\$	<b>1,027,555</b>	<b>847,357</b>	<b>632,733</b>	<b>837,682</b>	<b>810,392</b>
Hake and cusk..... cwt.	321,605	385,953	379,959	262,897	353,598
\$	<b>890,265</b>	<b>757,456</b>	<b>520,051</b>	<b>313,921</b>	<b>490,979</b>
Trout..... cwt.	73,662	88,071	115,999	67,890	73,164
\$	<b>699,950</b>	<b>741,610</b>	<b>870,209</b>	<b>623,504</b>	<b>652,619</b>
Pickarel..... cwt.	86,425	105,428	55,722	97,555	61,003
\$	<b>650,632</b>	<b>871,719</b>	<b>901,183</b>	<b>657,783</b>	<b>449,539</b>
Pollock..... cwt.	189,908	143,306	138,801	159,788	150,094
\$	<b>486,195</b>	<b>268,756</b>	<b>193,788</b>	<b>214,195</b>	<b>187,723</b>
Pike..... cwt.	79,383	73,993	69,229	97,724	64,925
\$	<b>429,366</b>	<b>404,453</b>	<b>347,355</b>	<b>469,919</b>	<b>372,868</b>
Tullibee..... cwt.	64,910	58,537	55,787	50,946	20,157
\$	<b>333,686</b>	<b>301,060</b>	<b>165,569</b>	<b>156,529</b>	<b>63,910</b>
Clams and quahaugs.... brl.	55,655	54,942	73,713	87,972	121,135
\$	<b>222,965</b>	<b>195,805</b>	<b>240,611</b>	<b>282,876</b>	<b>368,325</b>
Alewives..... cwt.	98,277	80,020	97,032	90,935	61,768
\$	<b>106,482</b>	<b>117,083</b>	<b>120,126</b>	<b>106,906</b>	<b>85,445</b>
Perch..... cwt.	24,707	22,773	19,218	23,062	14,497
\$	<b>126,723</b>	<b>114,656</b>	<b>95,119</b>	<b>115,220</b>	<b>72,985</b>
Oysters..... brl.	13,632	18,361	21,386	26,545	29,828
\$	<b>109,265</b>	<b>147,751</b>	<b>147,628</b>	<b>177,979</b>	<b>173,753</b>

\* Black cod included.

## ATLANTIC FISHERIES.

*Cod, Haddock, Hake, Cusk and Pollock.*

A much greater quantity of cod was taken in 1917 than in any of the four preceding years. The catch on some parts of the coast was rather poor, notably on the northern coast of New Brunswick, where adverse weather interfered with the work of fishing, and on the coast of Bonaventure and part of Gaspé, where the fish did not appear until the fall.

Elsewhere cod were plentiful, and the high prices paid induced fishermen to prosecute the fishery with more than usual vigour. In the district westward of Halifax, N.S., which includes the headquarters of the off-shore bank fishing fleet, there was a very large increase in the catch of cod.

Over 90 per cent of the whole production of haddock is landed by the fishermen of Nova Scotia. In the eastern part of the province there was a remarkable increase due mainly to the successful operation of trap nets at Ingonish, Victoria county. There was also a great increase in the central part, that is, between Canso and Halifax. The operation of two steam trawlers no doubt added much to the production of haddock in this section. In the western part of the province, on the other hand, there was a decrease in the quantity taken.

While considerable quantities of hake and pollock are taken in the gulf waters between Inverness county, Nova Scotia, and Kings county, Prince Edward Island, and off the eastern parts of the south coast of Nova Scotia, the great producing area lies at the mouth of and in the Bay of Fundy. Hake are landed in largest quantities by the fishermen of Digby county, Nova Scotia, and pollock by the fishermen of Charlotte and St. John counties, New Brunswick. There was an increase in the quantity of hake landed eastward of Halifax, but it was not sufficient to offset a decrease in the landings in the western part of Nova Scotia and Charlotte and St. John counties. On the other hand there was a larger catch of pollock all over.

The proportion of the catch of cod, haddock, hake and pollock that is dried for market grows less year by year. More of it is being marketed in a fresh or frozen condition; in a semi-soft or salted condition, as boneless; in a smoked condition as finnan haddies or fillets; and in cans, either fresh or smoked. The increased demand for the fish prepared in these ways has greatly enhanced its value, and has had much to do with the great advance in the price of dried fish in recent years.

*Herring, Sardines, and Mackerel.*

The catch of herring was much below the average. On all parts of the Nova Scotia coast it was rather greater, but in the gulf of St. Lawrence, chiefly along the shores of the northern counties of New Brunswick and the Magdalen islands, where more than half the total Atlantic herring catch comes from, much smaller quantities than usual were taken.

These fish are in greatest abundance during the spring months in the gulf and as drift ice remained in the bays and harbours longer than usual, the bulk of the fish had spawned and moved away before the fishermen were in a position to put out their fishing gear.

Of the total catch of herring on the Atlantic coast, 29 per cent was marketed in a fresh, smoked, or canned state; 30 per cent was marketed as pickled fish; 29 per cent was used as bait in the lobster fishery and in the fishery for cod, haddock, etc. About 12 per cent of the catch was used for fertilizing the land, mainly along the gulf shores.

While it is regrettable that so large a proportion of the catch should be used as fertilizer, it must not be forgotten that the fish so used are those caught in

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the spring time, and as they are usually in great abundance the fishermen's nets sometimes secure more than they can use for bait, and as such fish are useless for any other purpose after they have spawned, it would be absolute waste to throw them back into the sea rather than use them to fertilize farming lands.

The sardine fishery is confined to the Bay of Fundy district and mainly to Charlotte and St. John counties, New Brunswick. The total catch was the smallest in the last four years, but high prices more than made up for the decrease in quantity. The bulk of the fish was sold fresh for canning purposes in the state of Maine. Two establishments in the province of New Brunswick, however, canned 168,000 cases, which, notwithstanding the smaller catch, is 15,000 cases greater than their pack in the preceding year.

The total catch of mackerel was larger than that of the year before, but the fish were not equally abundant on all parts of the coast. Along the south shore of Nova Scotia and northern New Brunswick mackerel were plentiful and large quantities were taken. In the Magdalen Islands and Prince Edward Island districts the quantity landed, of fall fish especially, was much smaller than usual.

About 44 per cent of the mackerel catch was marketed fresh or frozen, about 53 per cent was cured in salt, and about 3 per cent canned. The United States is the principal market for salted mackerel, and as that market was unable to obtain its usual supplies from Europe, the demand for Canadian mackerel was unusually good, and prices advanced to nearly 100 per cent over normal, especially for fat fall fish.

The quantity of each of the kinds mentioned above landed in the last five years are shown in the following table:—

		1917.	1916-17.	1915-16.	1914-15.	1913-14.
Cod.....	cwt.	2,215,455	1,962,860	2,116,886	1,772,864	1,635,379
Haddock.....	"	712,416	582,028	582,522	566,002	405,633
Hake and cusk.....	"	321,412	385,953	379,959	262,897	353,598
Pollock.....	"	189,908	143,306	138,801	159,788	150,094
Herring.....	"	787,681	1,145,229	1,309,952	1,462,578	1,703,543
Sardines.....	brl.	274,359	315,832	336,794	298,885	141,384
Mackerel.....	cwt.	167,067	156,075	180,990	143,712	215,442

*Other Sea Fish.*

The quantity of halibut landed, by Nova Scotia fishermen chiefly, was over 30 per cent greater than the preceding year's catch. The landings of flat fishes exceeded those for 1916 by about 27 per cent. Skate is being more and more utilized for food purposes, and the quantity landed during 1917 increased by about 55 per cent. Tom cod are caught chiefly on the north coast of New Brunswick during the winter season. The catch shows a slight decrease. Over 100 per cent more swordfish were taken, but the catch of albacore was less by about 12 per cent. The fishery for swordfish and albacore is practically confined to the coast of Nova Scotia. About the usual quantities of bait fish, such as squid and caplin, were taken.

*Shellfish.*

The lobster fishery is the most important shell fishery we have. In point of value it ranks next to the cod fishery. The total catch in 1917 fell short of that of the preceding year by about  $1\frac{1}{4}$  per cent, notwithstanding the extension of the fishing season for a month longer than usual over all the gulf of St.

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Lawrence. It should be noted, however, that the catch in 1916 was 8 per cent greater than that in 1915 and 17 per cent greater than that in 1914.

In Charlotte and St. John counties, New Brunswick, there was a slight increase, but the total was considerably less than the average. In the western part of Nova Scotia there was a decrease of 16 per cent. The fishing began in mid-winter in this district, and many traps and boats were destroyed by storms during the opening months, which in a large measure, no doubt, accounts for the decrease there. In the section which embraces the counties of Halifax and Guysborough, there was a decrease of 20 per cent, but farther east in Cape Breton Island district the fishery resulted in a slight increase.

In the Prince Edward Island district the catch was extremely poor at the beginning of the season, owing to the prevalence of unfavourable weather. The extension of the season, however, for a month, gave an increase over the preceding year of 11 per cent, but it has to be noted in this connection that the catch in the preceding year was about 30 per cent greater than that in either 1915 or 1914.

In the New Brunswick counties which border the gulf there was an increase of about 7 per cent. This was mainly due to the extra month's fishing—the early part of the season being rough and fishing poor. As in the case of Prince Edward Island, the result of the preceding year's fishing was over 30 per cent greater than that in 1915 or 1914. There was a slight decrease in the province of Quebec, due to stormy weather on the Gaspé coast.

There were 660 establishments engaged in canning lobsters on various parts of the coast, and the output amounted to 195,993 cases of 48 pounds each. There were 84,569 hundredweights shipped fresh in shell to market.

The oyster catch on the Atlantic coast was 4,956 barrels less than that in the preceding year. Unfortunately, the production has been falling off from year to year for some time. The oyster beds are located mainly along the shores of northern New Brunswick, Prince Edward Island, and the gulf shores of Nova Scotia. In all three provinces the decrease was common. It is hoped that private culture, which is now being taken up, and more restrictive regulations, will prevent further diminution.

There was a slight decrease in the catch of clams of various kinds. About 40 per cent of the total was canned. Part of the balance was consumed fresh and part used as bait.

The following table is given to show the comparative landings of the chief kinds of shell fish in the past five years:—

		1917.	1916-17.	1915-16.	1914-15.	1913-14.
Lobsters.....	cwt.	474,871	480,898	445,277	408,816	514,646
Oysters.....	brl.	11,483	16,799	20,296	24,777	27,148
Clams.....	"	50,257	53,864	63,065	75,031	104,768

#### *River-Spawning Sea Fish.*

The total catch of Atlantic salmon was about an average one. It was not equally good on all parts of the coast, however. There were very few salmon in the principal spawning rivers of Cape Breton island, more particularly Victoria and Inverness counties, and the quantity taken was therefore smaller than that in the preceding year. In the counties of Nova Scotia, south and westward from the gulf to and including Hants and Halifax, the catch was the best in the past twenty years with the exception of one. There was also an increase in the Nova Scotia counties still farther to the westward.

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There was a considerable falling-off in the quantity taken by the fishermen of Charlotte and St. John counties, New Brunswick. Drift-net fishermen found salmon plentiful in the Bay of Fundy, but unfavourable weather retarded operations. Salmon fishing on the St. John river was rather disappointing. On the north shore of New Brunswick, where the Restigouche, Miramichi, and other large though less important rivers empty into the gulf, there was an all-round decrease of 269 hundredweights. Greater catches were landed in the counties of Westmorland, Kent, and Gloucester, but in Northumberland county, and mainly in Miramichi bay, the catch was almost 2,000 hundredweights less. Stormy weather is said to have curtailed operations. The quantity taken in Restigouche county was slightly less than that in the preceding year.

In the province of Quebec the catch was over 1,200 hundredweights short of last year's, owing to storms during May, and the flooding of rivers by heavy rains.

The catch of smelts was greater by 5,194 hundredweights. Almost 78 per cent of the total catch was produced in the northern New Brunswick counties. In that section of the coast the increase amounted to 523 hundredweights. In other parts of the coast the increase was greater, relatively.

The catch of alewives was above the average of the last five years. The increase over last year was 18,000 hundredweights. In St. John harbour, where 56 per cent of the total landings was taken, there was an increase of 15,000 hundredweights. In the western part of Nova Scotia there was a very considerable decrease. About 75 per cent of the catch was cured in salt, for which there was a good demand at good prices. Part of the balance was consumed fresh or smoked, and a part used as bait.

The catch of shad was about 20 per cent less than in 1916. Compared with the years 1913 and 1914, however, 1917 shows an increase of 43 per cent over the former and 30 per cent over the latter.

The following table shows the quantities of the chief river-spawning sea fish taken during 1917 and the four preceding years:—

	1917.	1916-17.	1915-16.	1914-15.	1913-14.
Salmon..... cwt.	39,865	41,801	39,805	38,202	40,237
Smelts..... "	71,989	66,795	65,074	91,634	86,538
Alewives..... "	98,277	80,020	97,032	90,935	61,768
Shad..... "	6,970	8,388	9,367	5,351	4,855

*Seals.*

The seal hunt in the gulf of St. Lawrence resulted in the capture of 31,145 hair seals against 23,227 in the preceding year.

## INLAND FISHERIES.

More pickerel, but rather fewer trout, were taken in the inland waters of New Brunswick. There was a decrease of 50 per cent in the catch of eels.

There was little difference in the production of fish in the inland waters of Quebec, except that the catch of eels was about 40 per cent less.

A smaller quantity of whitefish and pickerel was taken from Ontario waters, but the catch of herring was much greater.

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There was an increased production of all the chief kinds in the waters of Manitoba. The summer catch of whitefish in lake Winnipeg was very good. The fish were of a good size, and fishermen did well. Winter fishing in the northern lakes was not quite so good, owing to the fact that a period of mild weather made the ice unsuitable for operations until the beginning of December.

In Saskatchewan there was an increase of 34 per cent in the catch of whitefish; of 10 per cent in the catch of pike; and 20 per cent in that of pickerel.

In Alberta, whitefish gave an increase of 28 per cent; pike an increase of 34 per cent; and pickerel an increase of 40 per cent.

It is reported that the smaller lakes in the provinces of Saskatchewan and Alberta appear to be as well stocked as ever, despite the fact that settlers are turning their attention more and more to the catching of fish, not only to provide a substitute for animal food in their diet, but to use it as an article of commerce as well.

In the Yukon Territory the catch of whitefish, trout, and grayling fell short of the preceding year's yield. Two lakes in the Stewart district were opened up to commercial fishing, and the returns indicate that the future catch of pike and pickerel may be of considerable importance.

The salmon run in the Yukon waters was about normal, except in the Porcupine river, where for some reason it failed. The total catch was, therefore, slightly less.

The following table shows the comparative quantities of the principal kinds of fresh-water fish taken in all the inland waters of Canada in the last five years:

		1917.	1916-17.	1915-16.	1914-15.	1913-14.
Whitefish.....	cwt.	178,838	164,992	153,529	159,894	137,887
Lake Herring.....	"	206,786	110,055	117,370	92,307	131,614
Trout.....	"	70,672	85,622	111,361	63,340	68,491
Pickerel.....	"	86,425	105,428	55,722	97,555	61,603
Pike.....	"	79,383	73,993	69,229	97,724	64,925

#### PACIFIC FISHERIES.

##### *Salmon.*

In point of value the salmon fishery of British Columbia is by far our most important fishery. Its value in 1917 represented about 77 per cent of the value of all the fisheries products of that province, and about 32 per cent of the total value of the fisheries products of the whole of Canada.

The usual fourth-year big run of sockeye salmon in the Fraser River district, which was expected in 1917, did not materialize. Consequently, the pack of that particular grade on the Fraser was not more than 18 per cent of an ordinary big year. This great decrease is clearly attributable to the rock slide at Hell's Gate canyon in 1913, due to the blasting operations connected with the construction of the Canadian Northern Railway along the left bank of the river, which prevented a sufficient number of fish from reaching the spawning beds to produce a big run in 1917.

Notwithstanding this failure, however, the total pack of salmon throughout the province was a record one. Other grades which, prior to the outbreak of war, were practically neglected by packers, are now keenly sought after and packed in ever greater quantities. Of the total catch of all kinds, 82 per cent was canned; 15 per cent consumed fresh or frozen; while the balance was marketed in a mild-cured, dry-salted, and smoked condition.

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The extent to which the canning of the cheaper grades has developed in recent years will be gathered from the following table, which gives the annual pack of each class for the last five years:—

	1917.	1916-17.	1915-16.	1914-15.	1913-14.
	CASES.	CASES.	CASES.	CASES.	CASES.
Sockeye.....	339,848	214,780	476,042	536,696	972,178
Red Spring.....	48,630	51,231	51,734	32,908	37,433
White Spring.....	27,646	15,495	6,370	16,420	3,616
Chums.....	475,273	240,201	82,000	184,474	77,965
Pinks.....	496,759	280,644	367,352	220,340	192,887
Cohoos.....	157,589	183,623	146,956	120,201	69,822
Blue Backs and Steelhead.....	11,740	9,082	2,927		
Total Pack.....	1,557,485	995,065	1,133,381	1,111,039	1,353,901

The capture of salmon by means of trolling is developing fast in all the coastal waters of the province. Many fishermen are giving up gill-net fishing and adopting this method. The cost of outfitting for trolling is less than for gill netting, and the fisherman is usually left with larger net earnings at the end of the season.

*Halibut.*

The halibut fishery is carried on almost entirely in the northern waters of the province. For a number of years there has been a steady diminution in the quantity taken. The landings in 1917 were less than those in the preceding year, but it has to be noted that the drop is only about 8 per cent against a 37 per cent drop from 1915 to 1916. From the beginning of the year the price gradually rose until in October it reached 18½ cents per pound to the fishermen. It fell again to 15 cents toward the end of the year. There was a shortage of bait as usual during the summer months, due not so much to scarcity of bait fish as to the disinclination to fit out and go farther to sea after them at that season of the year.

*Herring.*

The production of herring was slightly less than in the preceding year, but its value was greater. A somewhat smaller quantity was dry salted for the cheaper markets of the Orient, while more than usual was canned and cured in the Scotch style, for which high prices were secured. Of the total catch, 12 per cent was used as bait; 56 per cent was dry salted; and 32 per cent consumed fresh, canned, smoked, and pickled. Not more than 27 per cent of the total herring value was contributed by the dry-salted fish, however; while no less than 68 per cent of the value was accounted for by fish that were used fresh, canned, smoked, and pickled.

*Other Sea Fish.*

Black cod are steadily increasing in importance as a food fish. The quantity landed in 1917 was 38 per cent greater than in the preceding year. The bulk of the increase is due to the fact that halibut fishermen now bring in all they take of this fish. It is marketed chiefly in a fresh or smoked condition. The total catch of flatfishes of various kinds was greater by more than 120 per cent.

These are of excellent quality, and as they become better known to the consuming public will certainly be used in ever greater quantities. Pilchards appear in our returns for the first time. A total of 1,363 cwts. was landed on the west coast of Vancouver island, from which there were canned 1,090 cases

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(of 48 lbs. each) and 200 barrels cured in salt. The catch of smelts, skate, and rock cod amounted in the aggregate to 3,883 against 2,620 cwts. in the preceding year.

### Shellfish.

The oyster fishery yielded 1,789 barrels, which represents an increase of about 15 per cent. Unlike the oyster fishery on the Atlantic coast, the British Columbia one seems to be increasing from year to year recently. The catch of clams amounted to 11,998 barrels. This is an increase of 40 per cent over the catch in the preceding year. Half the catch was used fresh, while the other half was canned. There were no less than 5,886 cwts. of edible crabs landed, which amounted in value to \$48,424. The catch of 1917 was nearly 80 per cent greater than that of 1916.

### Whales and Seals.

There were three whaling stations in operation on the Pacific coast, and the number of whales caught was 379. In the preceding year the catch was 403. The number of fur seals taken by the Indians along the coast amounted to 218 against 159 in the preceding year.

In the following table will be seen the quantities of the chief kinds of fish landed in British Columbia in the last five years:—

	1917.	1916-17.	1915-16.	1914-15.	1913-14.
Salmon..... cwt.	1,601,520	1,196,432	1,369,394	1,369,740	1,509,354
Herring..... "	487,241	496,030	467,452	563,406	649,062
Halibut..... "	113,529	123,062	194,896	214,444	223,465
Flatfishes, other..... "	15,632	7,013	4,575	6,642	2,180
Black Cod..... "	87,532	63,371	35,870	47,161	29,220

The relative total value of Atlantic, Pacific, and inland fisheries in the last five years is shown in the table which follows:—

	1917.	1916-17.	1915-16.	1914-15.	1913-14.
	\$	\$	\$	\$	\$
Atlantic.....	25,494,010	19,748,667	16,703,182	15,683,171	15,581,413
Pacific.....	21,518,595	14,637,346	14,538,320	11,515,086	13,891,398
Inland.....	5,299,439	4,822,365	4,619,206	4,066,374	3,734,937
Grand totals.....	52,312,044	39,208,378	35,860,708	31,264,631	33,207,748

In comparing the value produced in one division with that in another of the three divisions in the foregoing table it should be kept in mind that during 1917, for example there were 63,128 persons engaged in the fisheries of the Atlantic, 20,883 in those of the Pacific, and 11,111 in those of the inland waters.

Appended to this report are tables showing the quantity and value of each kind of fish, and the number and value of vessels, gear, etc., for the whole of Canada; also the quantity and value of each kind of fish, and the number and value of vessels, etc., by provinces.

Gasoline engines are being utilized more and more by fishermen on both the Atlantic and Pacific coasts to enable them to get speedily to and from the

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fishing grounds. In 1917 there were 14,823 boats with such engines in use against 12,828 in the preceding year.

The use of steam trawlers on the Atlantic coast in recent years has immensely stimulated the trade in fresh fish, by the regularity with which they land supplies. These vessels operate all through the winter as well as summer, and their trips to and from the fishing grounds can be exactly timed to suit the requirements of the trade. In view of the continued great demand for all kinds of Canadian fish at home, in the United States, and overseas, and of the preparations made for a vigorous prosecution of the fisheries on river, lake, and ocean during 1918, I look with confidence for another substantial increase in the value of our fisheries.

## CONCLUDING REMARKS.

In concluding this report I desire to say that both the Inside and the Outside Service of the Fisheries Branch are strongly represented at the front. At the outbreak of the war there were six officials in the Inside Service of the branch who were eligible for military service. Of these, five enlisted.

It is with the deepest regret that I chronicle the death of one of these,—Lieutenant B. W. Harmon, M.C., D.C.M., etc. Lieutenant Harmon was a young man of exceptional ability and high ideals. He had a deep sense of responsibility and most earnestly devoted himself to his Departmental duties. Had he lived he was destined to take an important part in the fisheries administration of this country.

At the outbreak of the war he was engaged on a special mission to the Pribilof islands—the United States fur seal group—in Alaska. At the first opportunity after learning that war was declared, he left for Ottawa to seek leave of absence and enlist. He went across with the first contingent as a private. He was promoted on the field to corporal and then to lieutenant. He was awarded the Distinguished Conduct Medal for conspicuous gallantry and devotion at Givenchy in June, 1915. Shortly afterwards he was awarded the Cross of St. George of Russia, and early in 1917 he was given the Military Cross, the official order stating that “he led a raiding party, bombed three dug-outs, inflicting many casualties, and brought back two unwounded prisoners.” Later on he joined the Flying Service in which he met his death while attacking, single-handed, eight enemy machines.

While all those who have gone overseas are performing gallant services, the work of Major Raymond Collishaw of the British Columbia Fisheries Patrol service has been so outstanding that special mention of it herein can involve no unfairness to any other. Mr. Collishaw entered the Flying Service in the early stages of the war. He was rapidly promoted until now he is a squadron commander, with the rank of major. Full information as to his achievements is not yet before me, but it is known that he has received at least five decorations, amongst them being the D.S.O. with bar, the D.S.C., and the Croix de Guerre, with palms. He has over fifty enemy planes to his credit. So far he has not been wounded.

Major J. A. Motherwell, chief clerk in the office of the chief inspector for British Columbia, after rendering conspicuous services was very severely wounded in action in France during the latter portion of the year, and was still in the hospital at the end of the year.

The work of the Fisheries Branch has been extremely heavy throughout the year, but it affords me pleasure to state that by continuous devotion to their duties on the part of both the officers and clerks it has been efficiently performed.

I am, sir, your obedient servant,

G. J. DESBARATS,

*Deputy Minister of the Naval Service.*

TABLE 1.—RECAPITULATION of the Quantities and Values of all Fish caught and landed in a Green State, and of the Quantities and Values of all Fish and Fish Products Marketed in a Fresh, Dried, Pickled, Canned, etc. State, for the **Whole of Canada**, during the year 1917.

Kinds of Fish.	Sea Fisheries.				Inland Fisheries.		Both Fisheries.		Total Marketed Value.
	Caught and landed		Marketed		Caught and Marketed		Marketed		
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
		\$		\$		\$		\$	
Salmon..... cwt.	1,640,476	10,121,803							
" used fresh..... cwt.			297,920	3,074,196	2,294	36,238	300,214	3,110,434	
" canned..... cases			1,557,921	14,021,244			1,557,921	14,021,244	
" smoked..... cwt.			1,617	28,197			1,617	28,197	
" dry-salted..... cwt.			14,270	139,211			14,270	139,211	
" mild-cured..... "			8,611	111,943			8,611	111,943	17,411,029
Lobsters..... "	474,871	3,284,508							
" canned..... cases			195,993	3,931,866			195,993	3,931,866	
" shipped in shel cwt.			84,569	1,722,399			84,569	1,722,399	5,654,265
Cod..... "	2,215,455	5,993,977							
" used fresh..... "			180,187	1,000,197			180,187	1,000,197	
" green-salted..... "			287,784	1,683,745			287,784	1,683,745	
" smoked fillets..... "			5,264	72,865			5,264	72,865	
" dried..... "			481,613	4,645,709			481,613	4,645,709	7,402,516
Black Cod..... "	87,532	494,209							
" used fresh..... "			73,164	743,229			73,164	743,229	
" smoked..... "			6,786	131,709			6,786	131,709	
" green-salted..... "			386	4,338			386	4,338	
" dried..... "			8	128			8	128	879,404
Haddock..... "	712,416	1,610,248							
" used fresh..... "			221,807	1,159,359			221,807	1,159,359	
" canned..... cases			13,137	84,522			13,137	84,522	
" smoked (fin-nans)..... cwt.			41,382	598,939			41,382	598,939	
" green-salted..... "			70,496	419,273			70,496	419,273	
" dried..... "			81,750	674,626			81,750	674,626	2,936,719
Hake and cusk..... "	321,605	619,007							
" used fresh..... "			25,795	93,585			25,795	93,585	
" green-salted..... "			6,873	40,115			6,873	40,115	
" smoked fillets..... "			5,314	64,026			5,314	64,026	
" dried..... "			88,961	692,164			88,961	392,164	
" smoked..... "			25	375			25	375	890,265
Pollock..... "	189,908	360,070							
" used fresh..... "			26,444	58,471			26,444	58,471	
" green-salted..... "			5,142	25,434			5,142	25,434	
" smoked fillets..... "			2,266	25,213			2,266	25,213	
" dried..... "			48,795	377,077			48,795	377,077	486,195
Herring..... "	1,274,922	1,578,647							
" used fresh..... "			207,432	541,126	205,805	1,003,018	413,237	1,544,144	
" canned..... cases			58,455	372,126			58,455	372,126	
" smoked..... cwt.			55,651	311,624			55,651	311,624	
" dry-salted..... "			161,865	328,721			161,865	328,721	
" pickled..... brl.			86,859	753,789	327	1,962	87,186	755,751	
" used as bait..... "			145,378	342,672			145,378	342,672	
" used as fertilizer..... "			50,338	38,650			50,338	38,650	3,693,688
Mackerel..... cwt.	167,067	967,383							
" used fresh..... "			75,831	701,783			75,831	701,783	
" canned..... cases			75	600			75	600	
" salted..... brl.			30,394	630,971			30,394	630,971	1,333,354
Shad..... cwt.	5,707	41,636							
" used fresh..... "			4,942	39,686	1,047	7,769	5,989	47,455	
" salted..... brl.			255	3,486	94	1,309	349	4,795	52,250
Alewives..... cwt.	91,831	130,919							
" used fresh..... "			24,723	50,419	1,427	4,281	26,150	54,700	
" salted..... brl.			22,369	134,254	1,673	7,528	24,042	142,782	196,482
Sardines..... "	274,359	1,028,391							
" canned..... cases			168,365	1,009,305			168,365	1,009,305	
" sold fresh or salted..... brl.			240,420	901,400			240,420	901,400	1,910,705
Halibut..... cwt.	140,024	1,540,377							
" used fresh..... "			139,780	2,064,123			139,780	2,064,123	
" smoked..... "			122	2,512			122	2,512	2,066,635

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TABLE 1.—RECAPITULATION.—of the Quantities and Values of all Fish, etc.

Kinds of Fish.	Sea Fisheries.				Inland Fisheries.		Both Fisheries.		Total Marketed Value.
	Caught and landed.		Marketed.		Caught and Marketed		Marketed.		
	Quantity	Value.	Quantity	Value	Quantity	Value	Quantity	Value	
		\$		\$		\$		\$	
Soles..... cwt.	8,244	28,493	8,244	81,109			8,244		81,109
Flounders..... "	10,659	24,241	10,659	55,995			10,659		55,995
Skate..... "	5,044	8,174	5,044	20,883			5,044		20,883
Smelts..... "	73,133	718,137	73,133	1,027,545			73,133	1,027,545	
" used as bait..... "			20	10			20	10	1,027,555
Oulachons..... "	1,231	4,836	1,231	10,991			1,231		10,991
Brill..... "	5,142	15,426	5,142	51,420			5,142		51,420
Tom Cod..... "	13,168	25,920	13,168	38,893			13,168		38,893
Octopus..... "	184	1,383	184	1,656			184		1,656
Rock Cod..... "	1,086	3,900	1,086	8,688			1,086		8,688
Pilehards..... "	1,363	2,726							
" salted..... brl.			200	2,000			200	2,000	
" canned..... cases			1,090	9,810			1,090	9,810	11,810
Whiting..... cwt.	545	1,722							
" used fresh..... "			345	1,725			345	1,725	
" smoked..... "			100	1,000			100	1,000	2,725
Grayfish (exported fresh)..... "	11,712	4,673	11,200	4,480			11,200	4,480	
" canned..... cases			289	1,300			289	1,300	5,780
Swordfish..... cwt.	4,338	22,590	4,338	33,178			4,338		33,178
Albacore..... "	15,657	52,843							
" used fresh..... "			15,521	81,451			15,521	81,451	
" canned..... cases			85	510			85	510	81,961
Oysters..... brl.	13,632	102,593	13,632	109,265			13,632		109,265
Clams & Quahaugs..... "	55,655	101,794							
Clams & Quahaugs, use fresh..... "			35,840	93,710			35,840	93,710	
Clams & Quahaugs used as bait..... "			360	720			360	720	
Clams & Quahaugs canned..... cases			19,445	128,535			19,445	128,535	222,965
Dulse, Crabs, Cockles, etc..... cwt.	19,540	53,290	9,601	66,918			9,601		66,918
Scallops..... brl.	6,600	26,800	100	800			100	800	
" shelled..... gal.			13,000	26,000			13,000	26,000	26,800
Squid..... brl.	7,339	23,975	7,339	29,751			7,339		29,751
Caplin..... "	27,769	41,407	27,769	41,449			27,769		41,449
Trout..... cwt.	2,990	32,188	2,990	45,133	70,672	654,767	75,662		699,950
Sturgeon..... "	466	5,709	466	10,045	5,439	87,966	5,905		98,011
Bass..... "	1,437	16,060	1,437	20,335	383	4,147	1,820		24,482
Eels..... "	3,978	23,455	3,978	30,647	7,656	59,810	11,634		90,457
Whitefish..... "					178,838	1,248,006	178,838		1,248,006
Pickarel..... "					86,425	650,632	86,425		650,632
Perch..... "	492	3,154	492	4,920	24,215	121,803	24,707		126,723
Pike..... "					79,383	429,396	79,383		429,396
Tullibee..... "					64,910	333,686	64,910		333,686
Maskinongé..... "					319	3,188	319		3,188
Catfish..... "					4,850	38,210	4,850		38,210
Goldeyes..... "					8,131	40,209	8,131		40,209
Carp..... "					16,695	40,890	16,695		40,890
Mullets..... "					11,013	22,026	11,013		22,026
Mixed Fish..... "	7,446	12,694	7,446	24,049	134,680	481,493	142,126		505,542
Tongues and Sounds..... "			3,650	84,635			3,650		84,635
Caviare..... lb.					11,831	15,106	11,831		15,106
Sturgeon Bladders..... No.					1,628	977	1,628		977
Salmon roe..... cwt.			1,564	7,820			1,564		7,820
Hair seals..... No.	31,145	43,320							
" skins..... "			31,145	71,690			31,145		71,690
Fur Seals..... "	218	2,180							
" skins..... "			218	6,540			218		6,540
Belugas..... "	91	682							
" skins..... "			91	682			91		682
Whales..... "	380	195,700							
Whale Bone and Meal..... tons.			291	10,185			291		10,185
Fertilizer..... "			1,267	71,889	2,250	922	3,517		72,811
Whale Oil..... gal.			437,245	342,422			437,245		342,422
Fish Oil..... "			582,943	397,164			582,943		397,164
Seal Oil..... "			84,927	83,937			84,927		83,937
Porpoises..... No.					82	4,100	82		4,100
Silver Hake..... cwt.	140	56	140	56			140		56
Witches..... "	5	15	5	50			5		50
Sea Weed..... tons.			550	550			550		550
Tomalley..... cases			253	5,060			253		5,060
Fish Offal..... tons.			150	300			150		300
Glue..... gal.			900	450			900		450
Gill Bone..... cwt.			510	12,802			510		12,802
Totals.....		29,370,516		47,012,605		5,299,439			52,312,044

TABLE 2.—RECAPITULATION of the Number of Fishermen, etc., and of the Number and Value of Fishing Vessels, Boats, Nets, Traps, etc., used in the Sea and Inland Fisheries of the **Whole of Canada** for the year 1917.

	Sea Fisheries.		Inland Fisheries.		Both Fisheries.	
	Number.	Value.	Number.	Value.	Number.	Value.
		\$		\$		\$
Steam fishing vessels (tonnage 2,413)....	44	1,010,943	131	742,100	175	1,753,043
Sailing and gasoline vessels.....	1,358	4,143,118			1,358	4,143,118
Boats (sail and row).....	22,780	1,011,979	4,564	130,841	27,344	1,142,820
Gasolene boats.....	13,933	4,257,521	890	363,223	14,823	4,620,744
Carrying smacks.....	522	372,785			522	372,785
Gill-nets, seines, trap and smelt nets, etc.	162,271	3,891,023		1,456,474		5,347,497
Weirs.....	734	745,765	305	44,385	1,039	790,150
Trawls.....	22,517	353,633			22,517	353,633
Spears.....			247	766	247	766
Skates of gear.....	6,828	86,440			6,828	86,440
Hand lines.....	72,681	89,790	4,054	4,888	76,735	94,678
Eel traps.....			74	198	74	198
Crab traps.....	1,140	5,700			1,140	5,700
Lobster traps.....	1,497,179	1,871,701			1,497,179	1,871,701
Lobster canneries.....	610	1,765,725			610	1,765,725
Salmon canneries.....	89	6,528,743			89	6,528,743
Oil factory.....	1				1	
Clam canneries.....	12	251,832			12	251,832
Sardine canneries.....	2				2	
Halibut dories.....	69	6,900			69	6,900
Salmon traps.....	2	10,000			2	10,000
Freezers and ice-houses.....	873	3,021,980	2,019	272,756	2,892	3,294,736
Fishing piers and wharves.....	2,808	2,357,484	273	75,269	3,081	2,432,753
Whaling stations.....	4	170,855			4	170,855
Pile drivers and seine reels.....	451	33,350			451	33,350
Fish wheels.....			3	355	3	355
Crab establishments.....	2	1,200			2	1,200
Oyster establishment.....	1	15,450			1	15,450
Salteries.....	3	12,000			3	12,000
Smoke and fish-houses.....	9,544	2,046,671	216	15,485	9,760	2,062,156
Totals.....		34,062,538		3,106,740		37,169,328

PERSONS EMPLOYED.

	Sea Fisheries	Inland Fisheries	Both Fisheries.
Number of men employed on vessels.....	7,431	755	8,186
“ “ boats.....	53,491	9,209	62,700
“ “ carrying smacks.....	760		760
Number of persons employed in fish-houses, freezers, canneries, etc.....	22,329	403	22,732
Number of men fishing (not in boats).....		744	744
Totals.....	84,011	11,111	95,122

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TABLE 3.—RECAPITULATION by Provinces, of the Quantities and Values of all Fish and Fish Products Marketed during the year 1917.

Kinds of Fish.	Nova Scotia.		New Brunswick.		Prince Edward Island.		Quebec.		Ontario.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
1 Salmon, used fresh.....	9,604	190,138	15,983	242,950	65	780	11,110	105,517		\$
2 " " canned.....	346	3,114					90	765		
3 " " smoked.....	199	4,975								
4 " " dry-salted.....	36	720					1,564	12,512		
5 " " mild-cured.....										
6 Lobsters, canned.....	78,426	1,582,310	43,549	870,980	62,000	1,240,000	12,018	238,576		
7 " " shipped in shell.....	64,096	1,488,861	19,603	224,404	112	1,456	758	7,588		
8 Cod, used fresh.....	151,346	903,352	13,254	49,302	3,688	15,442	11,899	32,041		
9 " " green-salted.....	81,063	545,492	20,961	123,888	24,382	184,072	161,378	830,293		
10 " " smoked fillets.....	5,264	72,865								
11 " " dried.....	299,654	3,031,825	34,630	346,300	6,124	61,240	141,205	1,206,344		
12 Black cod, used fresh.....										
13 " " green-salted.....										
14 " " smoked.....										
15 " " dried.....										
16 Haddock, used fresh.....	216,230	1,141,128	5,259	15,777	300	2,400	18	54		
17 " " canned.....	10,287	61,722	2,850	22,800						
18 " " smoked.....	41,382	598,939								
19 " " green-salted.....	70,066	417,705	75	325			355	1,243		
20 " " dried.....	78,024	646,726	2,035	15,520	613	5,912	1,078	6,468		
21 Hake and cusk, used fresh.....	24,839	90,102	157	327	291	1,164	365	1,277		
22 " " smoked.....										
23 " " green-salted.....	803	3,695			6,070	36,420				
24 " " smoked fillets.....	4,646	58,682	668	5,344						
25 " " dried.....	60,015	506,289	25,600	159,456	3,146	25,219	200	1,200		
26 Pollock, used fresh.....	8,955	23,492	17,489	34,978						
27 " " green-salted.....	5,142	25,434								
28 " " smoked fillets.....	2,266	25,213								
29 " " dried.....	32,804	265,140	15,991	111,937						
30 Herring, used fresh.....	35,110	94,561	9,485	25,662						
31 " " canned.....	7,263	36,315	4,542	31,704	2,738	5,582	76,930	84,191	201,801	992,909
32 " " smoked.....	10,354	60,997	32,030	193,590			7,004	28,012		
33 " " dry-salted.....										
34 " " pickled.....	58,453	499,201	7,491	61,248	975	6,825	12,974	70,649		
35 " " used as bait.....	51,750	150,146	29,932	66,979	8,486	25,458	26,425	28,265		
36 " " fertilizer.....	92	184	20,221	27,241			30,025	11,225		

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TABLE 3.—RECAPITULATION by Provinces, of the Quantities and Values of all Fish, etc.—*Con.*

Kinds of Fish.	Nova Scotia.		New Brunswick.		Prince Edward Island.		Quebec.		Ontario.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
37 Mackerel, used fresh.....	56,224	470,352	18,806	225,672	737	5,425	64	334		\$
38 " " canned.....	75	600								
39 " " salted.....	23,150	502,372	183	2,745	1,009	17,130	6,052	108,724		
40 Shad, used fresh.....	1,123	9,341	4,559	35,557			286	2,242		
41 " " salted.....	170	2,076	104	2,859						
42 Alewives, used fresh.....	6,104	11,812	20,046	42,888	100	500				
43 " " salted.....	2,809	18,329	21,133	122,953						
44 Sardines, canned.....	295	885	168,070	1,008,420			56	448		
45 " " sold fresh or salted.....	236	472	240,128	900,480			1,515	7,728		
46 Halibut, used fresh.....	24,877	336,820	103	1,075						
47 " " smoked.....										
48 Soles.....	438	2,460								
49 Flounders.....	4,401	20,745	3,837	9,127			442	2,522		
50 Skate.....	3,387	10,734	24	32						
51 Smelts.....	7,964	106,146	55,703	834,415	6,401	53,984	1,921	18,740		
52 Oulachons.....										
53 Brill.....										
54 Tom-cod.....	338	478	12,565	37,695	95	210	170	510		
55 Octopus.....										
56 Rock cod, etc.....										
57 Pilchards, salted.....										
58 " " canned.....										
59 Whiting, used fresh.....										
60 " " smoked.....										
61 Grayfish, used fresh.....										
62 " " canned.....	289	1,300								
63 Swordfish.....	4,338	33,178								
64 Albacore, used fresh.....	15,521	81,451								
65 " " canned.....	85	510								
66 Oysters.....	1,879	13,300	6,926	41,556	3,038	22,207				
67 Clams and quahaugs, used fresh.....	13,122	28,112	15,070	24,984	670	2,080	1,346	3,302		
68 " " " " canned.....	168	853	12,842	77,052	425	2,550	4	32		
69 Dulse, crabs, cockles, etc.....	2,810	13,605	905	4,889						
70 Scallops, shelled.....	13,000	26,000								
71 " " in shell.....			100	800						
72 Squid.....	4,852	23,733	407	1,628			2,080	4,390		
73 Caplin.....							27,769	41,449		
74 Trout.....	1,056	17,225	1,329	18,386	475	3,990	1,786	18,073	62,829	592,433

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75 Sturgeon.....	cwt.	46	690	1,408	15,977	1,325	19,874	75
76 Bass.....	"	1,271	19,065	3,345	3,377			76
77 Eels.....	"	1,348	12,992	6,288	51,782	1,689	10,139	77
78 Whitefish.....	"	56	840	3,124	31,310	49,498	474,602	78
79 Pickerel.....	"	247	2,470	153	2,111	25,216	252,232	79
80 Perch.....	"	10	40	410	2,787	15,170	75,833	80
81 Pike.....	"				30,079	15,574	124,590	81
82 Tullibee.....	"					10,139	60,835	82
83 Maskinonge.....	"			308	2,858			83
84 Catfish.....	"			30	250	4,420	35,360	84
85 Goldeyes.....	"							85
86 Carp.....	"			2,500	12,500	14,195	28,390	86
87 Mullets.....	"							87
88 Mixed fish.....	"	1,322	1,838	11,597	86,916	38,484	192,419	88
89 Tongues and Sounds.....	"	529	15,745	722	5,608			89
90 Caviare.....	lb.	100	150	425	900	5,806	5,806	90
91 Sturgeon bladders.....	No.					1,628	977	91
92 Salmon roe.....	cwt.	5	15	27,988	67,404			92
93 Hair seal skins.....	No.							93
94 Fur seal skins.....	"							94
95 Beluga skins.....	"			91	682			95
96 Bone meal.....	tons.							96
97 Fertilizer.....	"			2,250	922			97
98 Whale oil.....	gal.	250	175					98
99 Fish oil.....	"	86,090	65,342	160,177	144,158			99
100 Seal oil.....	"	9	5	75,743	75,743			100
101 Fish, offal.....	tons.							101
102 Glue.....	gal.	300						102
103 Tomalley.....	cases.	450						103
104 Porpoises.....	No.	5,060		82	4,100			104
105 Sea weed.....	tons.	550						105
106 Witches.....	cwt.							106
107 Gill bone.....	"							107
108 Silver hake.....	"	140	56					108
Totals.....			6,143,088	1,786,310	3,414,378		2,866,419	



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37	Mackerel, used fresh.....	cwt.
38	" canned.....	cases.
39	" salted.....	bbl.
40	Shad, used fresh.....	cwt.
41	" salted.....	bbl.
42	Alewives, used fresh.....	cwt.
43	" salted.....	bbl.
44	Sardines, canned.....	cases.
45	" sold fresh or salted. bbl.	
46	Halibut, used fresh.....	cwt.
47	" smoked.....	"
48	Soles.....	"
49	Flounders.....	"
50	Skate.....	"
51	Smelts.....	"
52	Oulachons.....	"
53	Brill.....	"
54	Tom-cod.....	"
55	Octopus.....	"
56	Rock cod, etc.....	"
57	Pichards, used fresh.....	bbl.
58	" canned.....	cases.
59	Whiting, used fresh.....	cwt.
60	" smoked.....	"
61	Grayfish, used fresh.....	cases.
62	" canned.....	bbl.
63	Swordfish.....	cwt.
64	Albacore, used fresh.....	"
65	" canned.....	cases.
66	Oysters.....	bbl.
67	Clams and quahaugs, used fresh.....	"
68	" canned.....	cases.
69	Dulse, crabs, cockles, etc.....	cwt.
70	Scallops, shelled.....	gal.
71	" in shell.....	bbl.
72	Squid.....	"
73	Caplin.....	"
74	Trout.....	cwt.
75	Sturgeon.....	"
76	Bass.....	"
77	Eels.....	"
78	Whitefish.....	"
79	Pickrel.....	"
80	Perch.....	"
81	Pike.....	"
82	Tullabee.....	"
83	Maskinonge.....	"
84	Catfish.....	"
85	Goldeyes.....	"
86	Carp.....	"
87	Mullets.....	"

TABLE 3.—RECAPITULATION by Provinces, of the Quantities and Values of all Fish, etc.—*Con.*

Kinds of Fish.	Manitoba.		Saskatchewan.		Alberta.		Yukon.		British Columbia.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
88 Mixed fish.....	74,640	\$ 158,750	8,372	\$ 22,638	1,177	\$ 3,335	755	\$ 19,075	1,648	\$ 13,184
89 Tongues and sounds.....										
90 Caviare.....	5,500	8,250								
91 Sturgeon bladders.....										
92 Salmon roe.....									1,564	7,820
93 Hair seal skins.....										
94 Fur seal skins.....									218	6,540
95 Beluga skins.....										
96 Bone meal.....									291	10,185
97 Fertilizer.....									1,220	70,164
98 Whale oil.....									436,995	342,247
99 Fish oil.....									44,820	23,892
100 Seal oil.....										
101 Fish offal.....										
102 Glue.....										
103 Tomalley.....										
104 Porpoises.....										
105 Sea weed.....										
106 Witches.....									5	50
107 Gill bone.....									510	12,802
108 Silver hake.....										
Totals.....		1,543,288		320,238		184,009		67,400		21,518,595

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TABLE 4.—RECAPITULATION by Provinces of the Number and Value of Fishing Implements, vessels, boats, etc., used in the Fishing Industry of Canada during the year 1917, and the number of Persons employed.

Province.	Persons employed.			Vessels tugs and carrying snacks.		Boats.		Value of seines, trap and smelt nets, etc.	Value of hand lines, weirs, trawls, etc.	Value of lobster plant, etc.	Approximate value of salmon and other fish-houses, freezers, and fixtures.	Total value.
	Number in vessels etc.	Number in boats.	Number in canneries, fish-houses, etc.	Number	Value.	Gasolene.	Sail and row.	Total value.	\$	\$	\$	\$
Nova Scotia.....	4,814	16,953	4,790	805	2,499,010	5,219	7,793	1,481,625	863,607	354,416	2,847,050	9,695,818
New Brunswick.....	1,656	14,070	5,304	552	459,530	2,194	8,843	942,845	772,896	742,106	1,175,137	4,859,815
Prince Edward Isl'd.....	52	3,398	2,438	22	9,700	1,812	405	346,050	76,015	22,030	349,157	1,560,682
Quebec.....	80	9,577	2,064	31	27,805	1,652	3,693	718,538	395,309	99,235	554,452	2,288,794
Ontario.....	635	3,070	.....	120	601,100	7,702	1,108	343,164	1,147,692	3,988	235,238	2,331,182
Manitoba.....	120	2,072	182	11	141,000	7	1,062	53,323	166,713	100	101,420	462,556
Saskatchewan.....	.....	1,661	.....	.....	.....	11	540	12,782	56,407	141	3,250	72,580
Alberta.....	.....	1,032	30	.....	.....	54	378	31,102	36,518	30	10,830	78,480
Yukon Territory.....	.....	233	8	.....	.....	.....	112	3,215	3,225	493	5,500	12,433
British Columbia.....	1,589	11,378	7,916	514	2,500,801	3,172	3,548	1,837,820	1,829,115	119,381	9,519,941	15,807,058
Totals.....	8,946	63,444	22,732	2,055	6,268,946	14,823	27,413	5,770,464	5,347,497	1,341,920	14,803,075	.....

Grand Total Value..... \$37,169,328



Doc.

FIFTY-SECOND

ANNUAL REPORT

OF THE

FISHERIES BRANCH

Department of the Naval Service

FOR THE YEAR

1918

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

J. DE LABROQUERIE TACHÉ

PRINTER TO THE KING'S MOST EXCELLENT MAJESTY

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1920

UNITED STATES DEPARTMENT OF AGRICULTURE

WATER RESOURCES DIVISION

ANNUAL REPORT

FISHBERRY BRANCH

REPORT OF THE DISTRICT ENGINEER

FOR THE YEAR

1919

WASHINGTON, D. C.



*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O., etc., etc.,  
Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-second annual report of the Fisheries Branch of the Department of the Naval Service.

I have the honour to be,  
Your Excellency's most obedient servant,

C. C. BALLANTYNE,  
*Minister of the Naval Service.*

DEPARTMENT OF THE NAVAL SERVICE,  
OTTAWA, November, 1919.



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## DEPUTY MINISTER'S REPORT.

To the Hon. C. C. BALLANTYNE,  
Minister of the Naval Service.

SIR,—I have the honour to submit the fifty-second annual report of the Fisheries Branch of the Department of the Naval Service, which deals with:—

- (a) International Questions;
- (b) The various activities of the Branch;
- (c) The fishing operations of the year 1918.

### INTERNATIONAL FISHERY QUESTIONS.

#### FISHERIES COMMISSION.

The status of these questions was explained in my report for last year.

The International Commission, which was appointed last year to consider a settlement of outstanding fishery questions between Canada and the United States, completed its work during the past summer and submitted a joint report, dated September 6, to the respective Governments. While the report will be regarded as confidential until it is made public by the two Governments, it is understood that the Commission reached unanimous findings on all the matters referred to it.

Pending action by the two Governments on the report of the Commission it is anticipated that the arrangement for reciprocal privileges to the fishing vessels of either country in the ports of the other, that were adopted last year on the recommendations of the different sections of the Commission to their respective Governments, and which were fully explained in my last report, will remain effective. It is giving eminent satisfaction to practically all concerned on both the Atlantic and Pacific coasts. It has not only removed the irritating conditions that have been causing friction between the two countries for more than a hundred years, but it has facilitated the production of fish and the free movement thereof to all parts of this continent.

#### FUR SEAL FISHERY.

The good effects of the Pelagic Sealing Treaty of 1911 on the north Pacific seal herds are becoming strikingly evident. It will be remembered that when this treaty was entered into the seal-herds were on the verge of commercial exhaustion.

Under the treaty, Canada receives 15 per cent of the skins taken on the United States islands, 15 per cent of those taken on the Russian islands, and 10 per cent of those secured on the Japanese islands.

During the season 1918, 34,890 skins were taken on the United States islands and 550 on the Japanese islands. The latter islands are quite small. At the present time the only one on which seals are killed is Robin island, which was ceded by Russia to Japan following the close of the Russo-Japanese war. In the present unsettled conditions in Russia it has not been possible to ascertain how many seals, if any, were killed on the Russian islands during the year.

It will be remembered that in 1912, the first year that the treaty was effective, both the United States and Russia enacted a close season for five years, so that killing seals on the islands did not begin until 1917.

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Under the treaty Canada's share of the skins are to be handed over at the seal islands. This is an expensive method, as it involves sending a vessel to the islands each year. Also it is scarcely possible in practice to be sure that the skins that would be taken over there would be of average value. In the circumstances an arrangement has been entered into with the United States Government for the disposal of Canada's share of skins, which is eminently satisfactory to this country.

The United States Government conveys all the skins taken from the islands to market. They are all dressed and dyed and are sold at public auction, and the United States Government accounts to Canada for 15 per cent of the net proceeds.

The skins taken in 1918 have not yet been sold, but as they are in great demand and the prices are high it is anticipated that Canada's share will more than recoup the advance payments of \$200,000 plus \$10,000 per year during each year of the close season, made by the United States Government.

Keeping in view the rapidity with which the seal herds are increasing in number year by year, there is every reason to expect that the herds will speedily be brought back to a maximum of productivity, so that in the course of years an annual take of well over 100,000 seals may reasonably be expected.

### DEPARTMENTAL ACTIVITIES.

#### CAMPAIGN FOR GREATER PROTECTION OF LOBSTER FISHERY.

While Canada has still a wonderful lobster fishery—by far the most important in the world—there is no question that it has seriously declined on account of over-fishing, notwithstanding highly protective regulations that have ever been growing in stringency. Minimum size limits have been tried, but the majority of the lobsters have for years been so small on the portions of the coast where they are mostly canned, that the industry could not go on if any reasonable size limit from a protective standpoint were enforced. From time to time the fishing seasons have been shortened. The taking of egg-bearing lobsters at any time excepting for hatchery purposes is illegal. Lobster hatching on an extensive scale was also tried, but it proved absolutely ineffective in building up the fishery, and it has been decided to discontinue hatching under present methods.

The fact is that the lobster fishery is a peculiarly difficult one to protect. For instance, one of the most important requirements is the prohibition of the retaining of any egg-bearing lobsters that may be found in the fishermen's traps; but with the exercise of care a dishonest fisherman can readily and speedily remove the eggs in such a way as to make it exceedingly difficult to prove that he did so, especially when lobsters are being handled in large numbers as is usually the case at the places where the boats bring their catches ashore. Indeed, it is obvious that if the fishery is to be saved from commercial exhaustion, the department must have the close co-operation of the fishermen and cannerymen to such end, and with such co-operation it can not only be saved, but it can be built up to a maximum of productivity. With this object in view an educational campaign amongst those engaging in the different branches of the industry was undertaken this year. The campaign was placed in charge of Professor A. P. Knight, M.A., M.D., etc., of Queen's University, who for several years past has been engaging in a study of the natural history of the lobster, and whose informative reports thereon have been published by the department year by year. To assist him in this work the following persons were employed: Professor A. Vachon, of Laval University, who was assigned the gulf coast of New Brunswick; Professor H. G. Perry, of Acadia University, to whom was assigned the southern shore of Prince Edward island; Professor W. T. MacClement, of Queen's University, to whom was assigned the southern portion of Northumberland strait; Dr. M. McGillivray, of Kingston, to whom was assigned the southern portion of New Brunswick, and western Nova Scotia; Acting Professor J. T.

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Herbert, of the University of New Brunswick, to whom was assigned Cape Breton island; Mr. Andrew Halkett, naturalist of the department, who had been engaged in assisting Dr. Knight in investigations into the life-history of the lobster for several seasons past continued such work, and also assisted in the campaign in Prince Edward island and at the Magdalen islands.

The campaign started in April, and was mainly confined to May and June. Meetings of the fishermen and canners were held in halls, in the canneries, on the wharves, and indeed wherever a few of them could be collected, at which the natural history of the lobster was gone into in simple language, and discussions on the subject encouraged. The imperative need of each fisherman immediately returning to the water every egg-bearing lobster that he might find in his traps was strongly emphasized, as was also the responsibility of each fisherman and canner to his neighbour engaging in the industry, as apart from other considerations it is eminently unfair to those who zealously endeavour to carry out the full requirements of the law if one of their neighbours fails to do so.

While it is impossible to say in advance what the effects of this campaign will be, there are strong indications that it was highly successful. Apart from the direct information given those interested, probably one of the most important results has been that it has caused a great deal of discussion of the whole question of the natural history of the lobster, and of the means necessary to the proper protection of the industry amongst the fishermen and canners themselves. Such discussions must end in general enlightenment, and no doubt in a keener appreciation of the importance of co-operating with the department in affording the fishery the full measure of protection it requires. The department is so satisfied that this campaign has been the cause of much good that it will be continued during the season of next year.

Moreover, as lobsters are now in the category of luxuries, as a large portion of the canned product has in the past been marketed in Europe; as it was doubtful whether shipping accommodation would be available for the transportation of any lobsters for the overseas trade; as the cost of all fishing equipment and of tin plate, gasolene, etc., had become so high that it seemed doubtful whether a reasonable profit could be made from the industry this year; and as during the war it was urgent that all reasonable efforts should be centered on the production of sea fish that would enter into the food supply of the people generally, it seemed that the time was opportune for undertaking some extraordinary measures of lobster protection. Consequently, on June 5, 1918, a circular letter was sent to each canner, and to a large number of lobster fishermen summarizing the situation, and asking for an expression of view:—

1. As to the wisdom of prohibiting all lobster canning in 1919, and each second year thereafter until the fishery would be restored; and
2. That canning be allowed in June, 1919, so as to enable the using up of cans, etc., that might be on hand, and then prohibited for a period of years.

A large number of replies were received. While the opinions expressed therein differed quite widely as to what should be done, there was a remarkable unanimity of opinion that some effective measures should be taken.

In the circumstances it was considered best to call into conference those directly interested in the different branches of the industry to discuss the whole matter. Such conference was held at Halifax on August 8, 1918. It had been advertised by circular letter from the department, and by posters on all portions of the Atlantic coast. Fishermen and canners had been urged to attend, or those from each locality to delegate some one to represent them. The convention was largely attended, and most portions of the coast were represented, although those engaging in the canning branch of the industry were present in greater number than the fishermen. However, the fishermen from different parts of the coast were capably represented by delegates.

The convention was a satisfactory one. The whole question was discussed from the different angles, Dr. Knight having addressed the conference from the natural

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history standpoint. Resolutions were finally drawn up, and unanimously adopted, recommending in effect that canning be not prohibited any year, but that the fishing season be restricted to two months in the year on practically all portions of the coast, excepting from Halifax harbour to Digby county, inclusive, where the live lobster trade is the main branch of the industry, and where it was recommended that the fishing season should be reduced from five and a half months to three months. The seasons recommended were as follows:—

<i>District.</i>	<i>Fishing Season.</i>
The portion of the Nova Scotia coast from Halifax harbour to Digby county, inclusive..	March 1 to May 31, inclusive.
Halifax harbour to Red point, Cape Breton island.	April 20 to June 20, inclusive.
Red point to Cape North..	May 15 to July 15, inclusive.
Cape North and including the south shore of the St. Lawrence excepting the Magdalen islands and the portion of the Northumberland strait specified in the next paragraph. . . .	May 1 to June 30, inclusive.
The portion of Northumberland strait between a line drawn from the mouth of river Philip, Nova Scotia, to Victoria harbour, Prince Edward Island, to one drawn from Chock-fish river, New Brunswick, to West point, Prince Edward Island..	August 1 to September 30, inclusive.
Magdalen islands..	No change.

No size limits were recommended for any of these areas.

The other portions of the coast were not considered, as representatives were not present.

Following consideration of these recommendations the lobster fishery regulations were amended accordingly by Order in Council, September 30, 1918, with the following exceptions:—

(a) In the Gulf district from cape North to the south shore of the St. Lawrence, the fishing season was maintained from April 26 to June 26, as the department considered, in the light of all the information before it, that it would be unadvisable to allow fishing there later than June 26.

(b) In Northumberland strait the fishing season was fixed at August 16 to October 15 instead of the months of August and September, as the department's information showed that soft-shell lobsters would be taken if fishing were allowed during the first fortnight in August.

It is hoped that these regulations, that have been decided upon after such full deliberation, will not only be found efficient in enabling the fishery to be adequately protected, but that they will prove reasonably satisfactory to those engaging in the industry.

Also, it was obvious that the conference was a fitting conclusion of the educational campaign and that consequently the department will in future have a greater measure of co-operation from the cannery and fishermen in protecting the lobster fishery than it has experienced in the past.

Close investigations into the natural history of the lobster, and feasible methods of increasing the number thereof, will be continued.

#### TRANSPORTATION OF FRESH FISH.

One of the greatest, if not the greatest, of the problems facing the development of the demand for fish in this country is that of adequate and cheap transportation facilities. The department has, for years past, been doing everything it feasibly could towards securing such facilities.

Until the business acquires much larger dimensions than at present, express refrigerator car facilities are urgently required, but with the increase in passenger and express traffic the trains from the east have been so loaded, and the need for conserving

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coal on the railways has been so urgent, that at least during the war a regular refrigerator car express service seems impracticable.

Experience has demonstrated beyond question that fresh fish hauled by fast freight in refrigerator cars from the Atlantic coast reach Montreal in very much better condition than if shipped on ice in ordinary express cars. In these circumstances every effort has been made to develop the fast-freight service by refrigerator car into a practical express service.

With the object of making the best arrangements possible for the transportation of fresh fish from the Atlantic coast, the department called into conference representatives of the Canada Food Board, the Canadian National Railways, the Grand Trunk Railway, the Canadian Pacific Railway, the different express companies, and the Canadian Fisheries Association at Montreal on June 20 last.

At the conference it was made quite evident, as above indicated, that a regular refrigerator car express service is, for the present, impracticable, but it was arranged to inaugurate a special refrigerator car service by fast freight to be known as the "Sea Food Special", between Mulgrave and Halifax on the Atlantic coast, and Toronto. This train would move on schedule time as do express trains, and would leave Mulgrave and Halifax on Thursday, Friday, and Saturday of each week, and make the run to Montreal from Mulgrave in forty-seven hours. Shipments for Montreal and Toronto would be included in the same cars, if there was room for such, and on arrival at Montreal the shipments for that place would be removed, when the cars would be handed over to the Grand Trunk Railway, and were scheduled to reach Toronto twenty-four hours later.

As was explained in previous reports this department has, since 1908, been paying one-third of the express charges on shipments of fish from the Atlantic coast to points in Quebec and Ontario. This assistance, with other facilities afforded, has enabled the business to be so expanded that the time is approaching when it can feasibly be withdrawn; and as all the shipments on the days on which the "Sea Food Special" operates should be forwarded by that train, it was decided to withdraw the one-third rebate during such days. The "Sea Food Special" was inaugurated on the 27th of June, and the one-third rebate was discontinued on the 10th of July.

It was further decided that the express rebate should be withdrawn altogether at the end of the present fiscal year, and those interested have been so advised.

The "Sea Food Special" has operated, on the whole with much satisfaction. From the 27th of June to the 15th of November, one hundred and ninety-eight cars of fish were forwarded by it.

In December it became necessary to withdraw this train for a time to enable concentration of effort in moving the troops home, but the Canadian National Railways arranged to replace it by hauling two refrigerator cars on the Maritime Express and one on the Ocean Limited.

When the business increases to an extent that several cars of fish per day can be forwarded there seems to be no good reason why the requirements cannot be handled by fast freight, but in the meantime, when the demand has to be worked up, the need for an efficient and regular express refrigerator car service cannot be too strongly emphasized.

As was explained in my previous report, the payment of one-third the express charges on less-than-carload-lot shipments from the Pacific coast to points in the Prairie Provinces was modified in the fall of 1917, with the object of enabling a market to be worked up in these provinces for the different species of flounders and cod that abound on the Pacific coast, and that, as in the past, would be going to waste on account of lack of demand therefor. Under the modified arrangement no assistance is given on shipments of halibut and salmon, the market for which is now well established, but two-thirds of the transportation charges on shipments of other fish, whether by express or by freight, are paid. This assistance, coupled with the efforts of the Canada Food

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Board, has enabled a greater demand for these fish to be worked up than was even anticipated. During the calendar year 1918 over five million pounds of cod and flatfishes—other than halibut—were marketed in the Prairie Provinces.

It was the intention to continue this arrangement, with a modification so that it would apply to fresh and frozen cod and flatfishes (other than halibut) only, for another year, but under the changed conditions that have come about, following the armistice, it has been found that with the assistance not applying to the Atlantic coast, it is causing an unfairness to the Atlantic coast dealers, who are now arranging to develop a greater demand for Atlantic fish in the Prairie Provinces.

In the circumstances it has been decided to discontinue the payment of any portion of the transportation from the Pacific coast after the end of August next so that from that date assistance of the character started in 1908 will be altogether discontinued.

The amounts paid, as one-third of the L.C.L. express shipments from both coasts, and under the arrangement obtaining from the Pacific coast since the fall of 1917, are as follows:—

Year.	From East Coast.	From West Coast.
1909-10 . . . . .	\$15,162 20	\$13,541 76
1910-11 . . . . .	16,898 13	21,896 73
1911-12 . . . . .	19,620 62	35,315 10
1912-13 . . . . .	29,969 48	29,277 13
1913-14 . . . . .	37,818 85	44,114 47
1914-15 . . . . .	26,667 32	34,528 60
1915-16 . . . . .	27,122 69	34,872 56
1916-17 . . . . .	32,717 73	36,799 80
1917-18 . . . . .	49,550 89	46,371 84
1918-19 . . . . .	37,366 31	53,480 98

The department will, however, continue its efforts to secure adequate transportation facilities and also to expand the demand for fish throughout the country and to these ends it has arranged to establish during the coming year a Publicity and Transportation Division in the Fisheries Branch.

#### BIOLOGICAL WORK.

Researches in biology were carried on during 1918 as usual, under the Biological Board, at St. Andrews, N.B., the estuary of the Miramichi river, New Brunswick, and at Departure bay, British Columbia.

The workers at St. Andrews included scientists from Toronto, McGill, Queens, Laval, and New Brunswick universities, also from St. Francois Xavier College, Antigonish, N.S., to whom were given the task of investigating the life-history of such fish as monk fish, and the sea-cat or wolf fish; eel-pout, sea-bass, and cod were also studied, and hydrographical and chemical researches carried on.

Dr. Huntsman, and some of the members of the staff, were engaged from May till September in important dredging and tow-netting operations in Miramichi bay.

Dr. Knight continued his investigations of the life-history of the lobster, at Caribou harbour, Nova Scotia, and took the lead in conducting an educational campaign amongst lobster fishermen with a view to the preservation of the fishery. The work at the British Columbia station was actively carried on by a staff from the universities of British Columbia and Alberta under the supervision of Dr. McLean Fraser, the curator of the station.

Dr. Fraser and his staff covered some problems of much interest to the salmon-fishing industry; and have practically completed a study of the life history of the various species of Pacific salmon.

A volume of biological memoirs, including sixteen separate researches, has been published, and a further volume, it is expected, will shortly appear. The forthcoming volume will consist of about a dozen reports embracing a variety of important fishery subjects.

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## FISHERIES MUSEUM.

The specimens belonging to the Fisheries Museum, which had to be stored in various places when the museum building on O'Connor street was demolished to make room for a new departmental block, have not yet been reassembled for exhibition. The curator was, therefore, engaged during the year in making observations on the natural history of the lobster under the direction of Dr. A. P. Knight of the Biological Board. The data thus gathered contain much useful knowledge concerning the weight, size, sex, and condition of this crustacean at various times and places.

The curator also took part in the educational campaign carried on amongst fishermen and packers during the year, with a view to the conservation of the lobster.

## FISH CULTURE.

The fish cultural operations for the calendar year, 1918, embraced the fresh water and anadromous species only, and were confined almost entirely to the commercial food fish, such as Atlantic salmon in the Maritime Provinces and Quebec; whitefish, lake herring, salmon trout and pickerel in Ontario and the Prairie Provinces, and Pacific salmon in British Columbia.

The commercial species were practically all distributed as fry, after the food-sac was absorbed, on the natural spawning areas, and largely where such eggs were collected, but a small percentage was reared to the advanced fry and fingerling stages.

The sporting species such as speckled trout in the East, and cut-throat and rainbow trout in the West, were hatched in small numbers, and practically all distributed in public waters, after adequate return was made to the areas where such eggs were obtained. A small percentage was allotted to privately controlled, or leased areas on the payment of nominal prices and all distribution expenses.

As the resources of the country were devoted to the prosecution of the war, and expenditures for other purposes were confined to absolute necessities, the service was not extended by the erection of new hatcheries, but the work was energetically carried on at existing establishments, and while there was a falling off in some species, the total distribution of fry and collection of eggs was 55,000,000 and 77,000,000 greater, respectively, than those for 1917. In whitefish the increase was, in the distribution, 71,000,000, and in the collection of eggs, 129,000,000.

The successful outcome was due to the conscientious and unsparing efforts of the field and hatchery officers, and greater co-operation with them on the part of the fishermen in some districts; to greater co-operation between the Dominion and Provincial Governments in the Great Lakes, and to more intimate relations between the Canadian and United States Government in contiguous waters.

The United States and Canadian Governments have combined in an effort to re-establish the sockeye fishery of Puget sound and the Fraser river. With this end in view the United States Bureau of Fisheries furnished 20,700,000 sockeye eggs from Alaska, which were hatched in the Harrison Lake hatchery, and the fry distributed in suitable spawning grounds in the Fraser River watershed.

There are thirty-four hatcheries, eleven subsidiary hatcheries, and seven salmon retaining ponds in operation. From these the total distribution of the different species in each province during the season of 1918, was as follows:—

Nova Scotia—		
Atlantic salmon.. . . .	7,057,600	
Speckled trout.. . . .	171,500	
		7,229,100
New Brunswick—		
Atlantic salmon.. . . .	8,696,662	
Ouananiche.. . . .	480	
Rainbow trout.. . . .	645	
Speckled trout.. . . .	161,835	
		8,859,622



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except at the head of some of the streams where a few healthy live ones remained—practically denuded of live oysters. He is of the opinion, and in this he is supported by all the private cultivators, that it is useless to think of re-stocking until the blight has completely run its course.

## FISHERIES PATROL SERVICE.

The Fisheries Branch has under its control a number of motor launches and small steamers, for the prevention of illegal fishing and for the general enforcement of the fisheries regulations in places where this cannot be properly done by land officers alone.

In patrolling Nova Scotia waters there were employed six of the department's own boats and three hired boats. One patrolled the waters of Northumberland strait, and two from Canso to the western boundary of Halifax county. Effective work was accomplished by both of these boats in suppressing illegal lobster fishing. Six boats patrolled the waters from Lunenburg county to Yarmouth county. A very active patrol was maintained, and very few violations of the law were reported.

In patrolling New Brunswick waters, four of the department's boats and one hired boat were employed. Three patrolled the waters of Charlotte county in the Bay of Fundy. The close seasons were generally well observed, but some illegalities, in the form of dynamiting pollock, occurred at times off Grand Manan. Three men were caught at this practice by the patrol boat officer and heavily fined, which put an end to further attempts at law breaking. Two boats patrolled the waters of the gulf counties, from Westmorland to Miscou island. One was engaged in supervising the salmon fishery at the mouth of the Miramichi river, and the lobster fishery along the coast, southwards. The other mainly patrolled the waters of Miscou and Shippigan islands, where illegally set lobster gear was found and destroyed, and the owners fined.

In patrolling Prince Edward Island waters, four boats were employed, mainly for the prevention of illegal lobster fishing. The efforts at illegal fishing in Prince county were persistent and a large amount of illegally used gear was broken up.

The Inspector of Fisheries for the province of Quebec makes use of a steamer for patrolling the gulf waters and enabling him to reach the widely separated and hardly accessible parts of his district. A hired motor boat was employed in patrolling the Magdalen Islands waters, where a number of lobster traps illegally set were seized and destroyed.

A small steamer owned by the department patrolled lake Winnipeg, in Manitoba, and assisted in the collection of fish eggs for the hatcheries of the lake during the season.

In patrolling the waters of British Columbia nineteen boats belonging to the department and nine hired boats were employed. Five boats patrolled the Fraser river, Howe sound, and part of the gulf of Georgia, in the southern district. Seven of the department's boats and nine hired ones patrolled the waters of the northern district. The regulations, on the whole, were well observed there, but a number of seizures were effected. Six departmental boats were engaged in patrolling the waters of the Vancouver island district, and in the course of the year made eleven prosecutions and eight seizures.

## DRIFT-NET FISHING OPERATIONS.

During the summer of 1918, the department's steamer *Thirty-three* was equipped with herring and mackerel nets, and sent to sea for the purpose of demonstrating the drift-net method of fishing.

Operations began early in June, and continued till October. The fish caught were sold in the port nearest to the fishing ground on which operations were being, at the time, conducted and where buyers were found prepared to handle the catches.

While it was not to be expected that the operations of one drifter would go far towards definitely determining the temporary location and marking the somewhat erratic movements of the herring and mackerel schools along the whole Atlantic seaboard, the results of this vessel's work, notwithstanding certain handicaps, would indicate that a regular drift net fishery for mackerel could be established, by a fleet of several boats, of a suitable size, working in conjunction and following the fish from the western end of Nova Scotia eastward and into the gulf of St. Lawrence, during May, June, and July.

The results would further indicate that a regular drift-net fishery for herring could be conducted, during July and August, by a similar fleet in the waters between Inverness county, Nova Scotia, and the east coast of Prince Edward island, which seem to be exceptionally well suited for the purpose.

A detailed report of the season's operations will be found as an appendix to this report.

FISH INSPECTION.

The inspection of pickled fish and barrels was carried on during the year 1918, as in the three preceding years, under authority of the Fish Inspection Act of 1914.

Prior to 1918 the work of inspection was confined to the Atlantic coast, where six inspectors were employed; but recent developments in the herring-curing business of British Columbia made the extension of the inspection scheme to that province necessary. Consequently, one inspector was appointed, towards the end of the past year, to advise packers and inspect their pack during the winter herring fishery on the Pacific coast.

Inspecting officers have no power to enforce the making of barrels or the packing of fish in accordance with the requirements of the Act. Notwithstanding that disadvantage, their efforts in the way of persuading and directing packers to use better packages and to pack better fish, have been on the whole productive of much good.

While the extent or value of the work of the inspectors cannot be judged alone by the number of barrels submitted—because of the practice of a number of packers who, after receiving instruction and advice from an inspector, sell and ship their fish without waiting for him to return and brand them—it is gratifying to be able to report that official inspection was made use of to a greater extent during the past year than in any previous year.

The following figures show the number of packers, who submitted their fish for inspection, and the quantity of fish inspected in each of the years in which the Act has been in operation:—

Year.	Packers.	Fish Inspected.
1915.. . . . .	16	1,320 barrels.
1916.. . . . .	73	7,213 "
1917.. . . . .	80	8,977 "
1918.. . . . .	110	20,664 "

In the year 1918, there were 16,667 barrels inspected on the Atlantic coast, and 3,997 on the Pacific.

Of the 20,664 barrels of fish inspected during the past season, 12,075 barrels were branded, while 8,589 did not receive the official brand. It should not be inferred therefrom, however, that the fish not branded were bad or unsaleable. As a matter of fact, most of them were good fish which, by reason of some defect in grading or in the quality of the package, fell somewhat short of the high standard required by the Act. It should be remembered that practically each lot submitted for inspection, whether branded or not, represented a more or less serious attempt by the packer at improved packing and compliance with the standards set.

Unfortunately, the services of three of the inspecting officers have been made little use of since inspection was instituted. Consequently, it was decided to ter-

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minate their engagement at the end of the year 1918. The names of the officers concerned are: H. H. Mann, Sydney, N.S., A. R. Hiltz, Mahone Bay, N.S., and Thomas Doyle, North Rustico, P.E.I. If any calls for inspection come from the districts of either of the discharged officers during the season of 1919, arrangements will be made to have such attended to by the remaining officers in the Maritime Provinces.

It is not customary for packers to send letters of thanks to the department for instruction and guidance given them in connection with this work, but two such were received recently—one from a packer in Nova Scotia, and the other from a packer in Gaspé—which may be quoted, to show something of the valuable nature of the work that is being carried on by the inspectors of pickled fish, covering as it does instruction in barrel making and fish-curing as well as the inspection of the finished product. The letter from the Nova Scotia packer. "Last summer, under your inspector's instruction, I cured some of our herring in the Scotch method, and am more than satisfied with the price received for same. When branding these fish the inspector informed me they were the finest cured fish he had branded this season. I simply followed his instructions, and I cannot understand why others don't do likewise."

The letter from the Gaspé packer: "I am writing to thank you for the services of your inspector, who instructed us and our men, this year, in the packing of herring in the Scotch style—the first to be packed in quantity on this coast. The inspector instructed us in the kind of barrels to be used, and had them shipped to us. Our packing was a success, and we obtained good value for our fish. Without the inspector's instruction we could not have operated. Again thanking you."

## CANNERY INSPECTION.

No fish or shellfish canning establishment is permitted to operate in Canada, except under a license issued by this department, after it has been assured of the suitability of the place for the handling of human food. Each cannery so licensed is subject to inspection under authority of the Meat and Canned Foods Act, at any time during operations.

Throughout the canning season of 1918, the department's outside staff of fishery officers periodically inspected all fish and shellfish canneries, and generally supervised the sanitary conditions under which operations were carried on therein.

On the Atlantic coast, lobsters were canned in 529 establishments; sardines in 3; salmon in 3; clams in 15; and other fish—such as herring, mackerel, haddock, etc.—in 22. In the Prairie Provinces, lake-fish were canned in one establishment. On the Pacific coast, salmon were canned in 90 establishments; herring, pilchards, etc., in 22; and clams in 2.

There were 2,317 inspections made and reported on. In the course of the year defects were noted in the buildings and equipment of four establishments, and the owners required to have them rectified.

Inspection under the Act, as amended 1917, which becomes effective during the season of 1919, will be more definite and comprehensive. The salient features of the amended Act are: (1) the inspection of buildings, utensils, and fish in accordance with regulations made thereunder, and appended thereto; (2) the authority granted to an inspector to stop the canning of fish which he considers unfit for human food; (3) the authority granted to an inspector to seize such fish on view; (4) the marking of cans with the name and address of the packer or the dealer who obtains the fish directly from the packer; a true description of the kind of fish (the species of salmon packed in British Columbia must be named) and the weight of the contents of the cans; (5) the correct marking of canned fish imported into Canada, so as to show their kind and quality, the place of origin, and the name and address of the packer or importer.

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It is anticipated that through the agency of the amended Act, the standard of packing will be further raised and that both producer and consumer will benefit thereby.

## BAIT-REPORTING SERVICE.

This service was instituted in 1913 for the purpose of providing masters of fishing vessels with definite information concerning bait supplies at points along certain parts of the Atlantic coast. The information is collected by officers of the Department, and sent by telegram daily to certain important ports and there posted up in a conspicuous place. It is also published in the Halifax and other daily newspapers. Copies of all telegrams are mailed weekly to headquarters at Ottawa, from where the work is directly supervised.

The service was continued during the season of 1918. In the spring months, 78 telegrams were sent from the Magdalen Islands, Souris, P.E.I., and Queensport, N.S., to Canso, Halifax, Lunenburg, and Riverport, N.S. In July and August, 130 telegrams were sent from Little Bras d'Or, L'Ardoise, Canso, Wine Harbour, and Musquodoboit Harbour, N.S., to North Sydney, Canso, Halifax, Lunenburg, and Shelburne, N.S.; also from Lockeport to Canso and Halifax, and from Shag Harbour and Digby, N. S., to Halifax, Shelburne, and Lockeport, N.S. From the beginning of September to the middle of November, 47 telegrams covering information as to supplies of bait in the counties of Charlotte and St. John, N.B., were despatched from Campobello, N.B., to Digby, Yarmouth, Pubnico, Clark's Harbour, Wood's Harbour, and Port La Tour, N.S.

That this service is beneficial alike to vessel fishermen in search of bait and net fishermen who have bait for sale, may be gathered from the following reports of the department's officers on the spot: Overseer Torrie, Digby, N.S.: "The bait reports have kept the boat fishermen informed as to what particular part of the county bait was being taken in. They have found the information of great value." Overseer Stoddart, Shelburne county, N.S.: "Owing to the great scarcity of bait in this locality, the reports were a great benefit. The fish dealers took advantage of the information contained in the reports, and wired localities where supplies were available and had fresh bait shipped to them; thus saving time to the fishermen and permitting them to continue operations. By means of the bait reports from New Brunswick, a good supply of lobster bait was secured and brought to the district. I may say that the bait reports during 1918 were of greater benefit than in any previous season". Overseer Walls, Shelburne county, N.S.: "I have talked with quite a number of the shore fishermen in my district, and also to many of the skippers of fishing vessels, and they have stated that it is a good thing for both net fishermen and vessel fishermen to have official reports of bait available". Overseer Hebb of Lunenburg county, N.S.: "I have made inquiries of the owners of Lunenburg fishing vessels, and they inform me that the results obtained from the publication of telegraphic reports concerning bait supplies last season were very beneficial, and their desire is that the service be continued". Overseer Cooper, Guysboro county, Nova Scotia: "Owing to the presence of submarines last summer, vessels did not visit my district for bait as in other years, but the bait reports kept the net fishermen in touch with the schools of bait, and in that way the benefit was great". Overseer Dillon, Guysboro county, N.S.: "The fishermen from Lunenburg and elsewhere, on arrival at points in my district where bait reports were posted, have found it a great convenience to have such information. I have thus been informed by vessel fishermen met and interviewed when going over my district".

## FISHERIES STATISTICS.

Under an arrangement between this department and the Dominion Bureau of Statistics, as was noted last year, the latter now compile and publish the annual statistics relating to the fisheries, as part III of its Census of Industry. The inform-

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ation is secured partly from manufacturing establishments, on individual schedules designed to fit in with the Bureau's general scheme of securing industrial statistics, and partly by the officers of this department, as in the past, from those fishermen and dealers who are not classed as manufacturers, but who market their own produce. The returns from both the manufacturers and our officers are checked in this department as before, and afterwards handed over to the Bureau of Statistics for publication. The new schedules were used for the first time, in taking statistics for 1918, and as neither the manufacturers nor the officers were quite clear, at the first, as to the filling in of the schedules, much correspondence resulted; while many of the returns had to be sent back for correction more than once. The delay thus caused prevented the Bureau of Statistics from having the full statistics compiled in time to permit of summarized tables being published in this report, the preparation of which has been postponed until now in the expectation that such tables would be available. Consequently, a general review only, made up from information obtained by the department from time to time, is given herein.

Monthly returns of the quantities and values of sea fish landed are sent to the department, as usual, by the officers in sea fishing districts. The returns are checked and compiled to show the landings in each county and province, and in the whole of Canada. The compiled information is then summarized in a report by the department, and made public through the press, monthly.

## FISHERIES EXPENDITURE, 1918-19.

	Appropriation.	Expenditure.
	\$	\$ cts.
Salaries and disbursements, Fishery officers.....	\$251,883.54	
Fisheries patrol service .....	209,829.35	
Oyster culture.....	5,154.99	
Fish breeding.....	300,000	241,211 61
Cold storage and transportation of fresh fish.....	110,000	107,957 85
Building fishways.....	10,000	5,728 16
Legal and incidental expenses .....	4,000	1,357 08
Fisheries Intelligence Bureau .....	5,000	2,090 44
Toronto exhibition .....	5,000	4,295 25
Inspection of canned or pickled fish.....	15,000	11,966 39
Marine Biological Board .....	26,000	26,000 00
<b>Totals.....</b>	<b>975,000</b>	<b>867,474 66</b>
Fishing bounty .....	160,000	159,675 25
Paid out of Consolidated Revenue Fund.....		4,618 29

Provinces.	Salaries and Disbursements of Fishery Officers.	Fish Breeding.	Fisheries Patrol Service.	Building Fishways and Clearing Rivers.	Inspecting Canned and Pickled Fish.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Nova Scotia .....	58,600 78	17,233 22	34,002 19	6 92	5,355 50
Prince Edward Island .....	9,173 49	3,003 84	4,379 11		1,285 60
New Brunswick.....	49,013 23	36,351 19	14,140 73		2,950 56
Quebec.....	7,095 93	12,923 27	41,563 30		50 00
Ontario.....		64,996 55			
Manitoba .....	11,587 83	29,405 83	22,058 23		
Alberta.....	15,267 84	4,920 96			
Saskatchewan.....	16,966 00	5,529 72			
British Columbia.....	70,598 27	59,048 99	85,068 41	5,721 24	2,317 62
Yukon .....	531 50				
General account.....	13,048 67	7,798 04	8,617 38		7 11
<b>Totals .....</b>	<b>251,883 54</b>	<b>241,211 61</b>	<b>209,829 35</b>	<b>5,728 16</b>	<b>11,966 39</b>

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## FISHERIES REVENUE, 1918-19.

	Amounts Collected.	Refunds.	Net Amounts.
	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	7,629 31	16 50	7,612 81
Prince Edward Island.....	2,561 19		2,561 19
New Brunswick.....	16,420 52		16,420 52
Quebec.....	8,135 80	14 00	8,121 80
Ontario.....	631 85		631 85
Manitoba.....	12,780 20	50 00	12,730 20
Alberta.....	10,293 15	5 00	10,288 15
Saskatchewan.....	4,982 83		4,982 83
British Columbia.....	59,349 94		59,349 94
Yukon.....	425 00		425 00
Totals.....	123,209 79	85 50	123,124 29

## FISHING BOUNTY.

Under authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the eastern Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1918, payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton; payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$6.25 each.

To owners of boats measuring not less than 13 feet keel, \$1 per boat.

To boat fishermen, entitled to receive bounty, \$3.80 each.

There were 14,452 bounty claims received, and 14,440 paid. In the preceding year, 14,532 claims were received, and 14,516 paid. The total amount paid was \$159,675.25, allocated as follows:—

To 784 vessels and their crews..... \$ 53,298 30

To 13,655 boats and their crews..... 106,376 95

The following table shows in detail the payment of the bounty by counties, for the year 1918:—

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Provinces and Counties.	No. of Vessels.	Tonnage.	Average Tonnage.	No. of Men.	Amount Paid.	No. of Boats.	No. of Men.	Amount Paid.	Total bounty paid to vessels and boats, 1918.
<i>Nova Scotia</i> :—					\$ cts.			\$ cts.	\$ cts.
Annapolis.....	.....	.....	.....	1	6 30	183	289	1,281 20	1,287 50
Antigonish.....	.....	.....	.....	131	1,230 70	169	238	1,073 40	1,073 40
Cape Breton.....	25	411	16	.....	.....	485	915	3,962 10	5,192 80
Cumberland.....	.....	.....	.....	.....	.....	4	6	26 85	26 85
Digby.....	9	401	44	102	1,037 50	410	700	3,070 00	4,107 50
Guysborough.....	54	856	15	250	2,419 50	856	1,366	6,649 40	8,468 90
Halifax.....	63	1,011	16	302	2,899 75	1,308	1,776	8,051 75	10,951 50
Inverness.....	26	363	13	126	1,151 25	401	799	3,437 40	4,588 65
Kings.....	.....	.....	.....	.....	.....	53	74	334 20	334 20
Lunenburg.....	161	8,805	54	2,312	23,256 65	547	638	2,971 40	26,228 05
Pictou.....	2	38	19	8	88 00	62	86	383 90	476 90
Queens.....	17	213	12	47	506 75	151	241	1,066 85	1,573 60
Richmond.....	42	792	18	227	2,211 75	552	924	4,063 30	6,275 05
Shelburne.....	35	797	22	252	2,373 15	617	1,134	4,927 15	7,300 30
Victoria.....	12	148	12	61	529 90	324	488	2,179 20	2,709 10
Yarmouth.....	25	969	38	331	3,038 75	163	317	1,367 60	4,406 35
<b>Totals</b> .....	<b>471</b>	<b>14,804</b>	<b>31</b>	<b>4,150</b>	<b>40,749 95</b>	<b>6,280</b>	<b>9,991</b>	<b>44,250 70</b>	<b>85,000 65</b>
<i>New Brunswick</i> :—									
Charlotte.....	8	123	15	33	329 45	380	627	2,762 80	3,092 25
Gloucester.....	259	3,700	14	1,104	10,601 60	220	27	2,222 95	12,824 55
Kent.....	14	149	10	38	386 75	44	79	344 20	730 95
Northumberland.....	4	73	18	12	148 00	6	15	63 00	211 00
Restigouche.....	.....	.....	.....	.....	.....	9	15	66 00	66 00
St. John.....	.....	.....	.....	.....	.....	30	42	189 60	189 60
<b>Totals</b> .....	<b>285</b>	<b>4,045</b>	<b>14</b>	<b>1,187</b>	<b>11,465 80</b>	<b>689</b>	<b>1,305</b>	<b>5,648 55</b>	<b>17,114 35</b>
<i>Prince Edward Island</i> :—									
Kings.....	5	92	18	12	167 00	456	648	2,918 85	3,085 85
Prince.....	10	144	14	38	381 50	527	1,317	5,531 90	5,913 40
Queens.....	2	25	12	6	62 50	145	312	1,380 60	1,393 10
<b>Totals</b> .....	<b>17</b>	<b>261</b>	<b>15</b>	<b>56</b>	<b>611 00</b>	<b>1,128</b>	<b>2,277</b>	<b>9,781 35</b>	<b>10,392 35</b>
<i>Quebec</i> :—									
Bonaventure.....	2	26	13	7	69 75	1,069	1,888	8,247 15	8,316 90
Gaspé.....	6	69	11	28	244 30	3,377	6,908	29,635 85	29,880 15
Rimouski.....	.....	.....	.....	.....	.....	86	110	504 20	504 20
Saguenay.....	3	45	15	18	157 50	1,026	1,916	8,309 15	8,466 65
<b>Totals</b> .....	<b>11</b>	<b>140</b>	<b>12</b>	<b>53</b>	<b>471 55</b>	<b>5,558</b>	<b>10,822</b>	<b>46,696 35</b>	<b>47,167 90</b>
<b>Grand Totals</b> .....	<b>784</b>	<b>19,250</b>	<b>24</b>	<b>5,446</b>	<b>53,298 30</b>	<b>13,655</b>	<b>24,305</b>	<b>106,376 95</b>	<b>159,675 25</b>

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## REVIEW OF THE FISHERIES OF 1918.

Detailed figures, compiled and completed, for the year 1918 are not yet available, but the information at present in the department is sufficient to permit of a general review and an approximate analysis of the year's fishing results being made in order to convey some idea of the increase or decrease in the production of the various kinds of fish as compared with the preceding years.

The estimated value of the fisheries of the whole of Canada in 1918 will exceed that in 1917, which amounted to \$52,312,044. But as the catch of most of the chief kinds of sea fish in 1918 was less, owing to some rather unusual conditions, on the Atlantic coast especially, the greater value is attributable to higher prices alone.

The first quarter of the year was marked by abnormally cold and stormy weather on the Atlantic, with ice infesting many harbours that are, as a rule, free from such obstructions. Indeed, the weather during each month of the year, with the exception of May, the latter half of July, and the whole of August and December, was characterized as very unfavourable for fishing—especially for boat fishing. Further, fishing, during August and September, both inshore and offshore, was very greatly interfered with by the presence of an enemy submarine, which sank several Lunenburg county vessels, one Yarmouth county vessel, and a Halifax steam trawler. Finally, the epidemic of influenza which over-ran the country caused many fishing vessels to be laid up while it lasted.

## ATLANTIC FISHERIES.

*Cod, Haddock, Hake, and Pollock.*

The quantity of cod landed was about 14 per cent less, and that of haddock, hake, and pollock each about 20 per cent less, than in the preceding year. While all the provinces show a shortage of cod, Quebec and Prince Edward Island show the highest percentage of decrease. The Lunenburg bank fishing fleet set out in the beginning of the year in somewhat greater force, and returned with an increased spring catch. The total quantity landed by the fleet for the whole season, however, was slightly less owing to the loss of vessels and the general interruption of operations by enemy undersea craft. In the northern parts of Cape Breton the high price of cod induced more fishermen to engage in that fishery with very satisfactory results.

The haddock catch of Nova Scotia the chief producer of these fish, was about 25 per cent less. This decrease was mainly due to the fact that at Ingonish, where haddock are caught largely in traps, the fish failed to appear as abundantly as usual in the spring. During May and June, 1917, there were taken at Ingonish, 160,000 cwts., whereas in May of 1918 none appeared and in June and July not more than 50,000-cwts. were caught.

*Herring, Sardines and Mackerel.*

The total quantity of herring taken was about 10 per cent greater. There was a small catch in Nova Scotia which was offset by an increased one both in New Brunswick and Quebec. As more attention is being given to the preparation of spring herring for food along the Gulf shores, this fishery is growing in importance and value. Owing to the sudden ending of the war towards the end of the year, the demand for salted herrings unfortunately fell off, and considerable quantities had to be either sold at a low rate or carried over till the succeeding consuming season.

The mackerel fishery resulted in a catch about 10 per cent greater than that of last year. More were landed in Prince Edward Island and Nova Scotia, but the catch in New Brunswick was less. Quebec produced about the same quantity as in the preceding year.

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The sardine fishery of the Bay of Fundy opened in a rather unpromising manner, but before the end of the season fish were abundant, so that with a large catch and high prices fishermen had a good season. The sudden ending of hostilities in Europe caused a drop in both the demand for and the price of the canned product, and packers were caught with large supplies on hand which afterwards were difficult to dispose of except at a price much below what was anticipated when the raw material was purchased.

*Other Sea Fish.*

Albacore, swordfish, and halibut are taken mainly by Nova Scotia fishermen. The quantity of halibut landed was about 20 per cent less, and of albacore and swordfish but slightly less than in the preceding year.

*Shellfish.*

The lobster catch of 1918 was little more than half the annual average catch of the four preceding years. The falling-off was common to all parts of the coast, but in some provinces it was much less pronounced than in others. For instance, the decrease from the preceding year in Quebec was 9 per cent and in Nova Scotia 35 per cent, while in New Brunswick it was 62 per cent and in Prince Edward Island 60 per cent. It should be noted, however, that on those sections of the coast where the decrease was greatest—northern New Brunswick, Prince Edward Island, and the Nova Scotia counties bordering the strait of Northumberland—the fishing period was extended for a month in 1917.

An analysis of the catches by counties in the provinces of Nova Scotia and New Brunswick shows the following: In the Gulf counties of the former province, Inverness, Antigonish, Pictou, Colchester and Cumberland the decrease was 45 per cent, attributable mainly to Pictou and Cumberland. In the eastern Atlantic counties, Victoria, Cape Breton and Richmond, there was a 27 per cent decrease. In the central counties, Guysborough and Halifax, the decrease was 31 per cent, chiefly in the latter county during April and May. In the western counties, Lunenburg to Digby, there was a decrease of 30 per cent. The range of decrease in the western counties was considerable; for example, the Shelburne county catch was 18 per cent less, while Yarmouth's decreased 30 per cent and Digby's about 38 per cent.

The decrease in the 1918 lobster catch is undoubtedly a serious one, and to some may, at first sight, seem to foreshadow the immediate end of this important branch of the fishing industry. But, while scarcity of lobsters on some of the fishing grounds may have had something to do with it, to other causes must the unsatisfactory results be chiefly attributed. During spring time, protracted spells of stormy weather and abnormal ice conditions prevented fishermen from operating regularly. Also, the greatly increased cost of lobster gear deterred fishermen from readily replacing lost equipment and carrying on as vigorously as in other years.

The quantity of oysters taken was slightly greater than in the preceding year. The catch of clams was also greater in all the provinces except New Brunswick.

*River-Spawning Fish.*

The total catch of Atlantic salmon was about 20 per cent less than an average one. In Nova Scotia there was a decrease of about 28 per cent, and in Quebec one of about 40 per cent. In New Brunswick, on the other hand, there was an increase of about 5 per cent; St. John county, in the Bay of Fundy, shows a decrease of 17 per cent, while the Gulf counties show an increase of 10 per cent. A curious thing about the increase in the Gulf counties is that, while Northumberland, the chief salmon county, shows an increase of 50 per cent, all the other counties show decreases of from 20 per cent to 50 per cent.

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The catch of smelts was very little less than in the preceding year. High prices were paid, and fishermen had a remunerative season.

The catch of alewives as a whole was less. In the county of St. John, New Brunswick, the chief centre of this fishery, there was a decrease of nearly 20 per cent, but in the Gulf counties of New Brunswick, the section next in importance to St. John county in the production of alewives, there was an increase of 20 per cent.

The quantity of shad taken was rather less than in the preceding year.

#### • INLAND FISHERIES.

In what is called the inland district of New Brunswick, which comprises the St. John river system, alewives were not so abundant as in the preceding year, but an increase in value offset the decreased quantity taken. Salmon fishing on the St. John river during the 1918 season was not so good as usual, mainly owing to the lateness of the run. In the northern sections of this inland district excessive rain kept the brooks very full of water, consequently trout fishing was not quite up to the average.

In the Great Lakes of Ontario, fishing for whitefish resulted in a catch of about 11,000 cwts. more than that of 1917. Almost all the increase, however, came from the Lake Superior district. Lake Ontario produced 1,700 cwts. more, but the output of lake Erie was 1,100 cwts. less. The total quantity of herring taken was slightly less than the preceding year's catch, notwithstanding a very considerable increase in the production from lake Superior. The lake Erie catch was several thousand cwts. less. Neither pickerel nor pike came up to the previous year's total, but there was quite a large increase in the catch of trout.

Fishing results in Manitoba, as a whole, were satisfactory. The summer fishery for whitefish in lake Winnipeg was good, and before the season closed fishermen had caught their allotted quantity. Pickerel and tullibee were not found so plentifully as in the preceding year, which may have been due to the fact that the winter fishery was held up by the late formation of ice on the lakes. The fishery in lake Winnipegosis and the lakes in the western part of the province resulted in about the same quantity being taken as in 1917. Higher prices were paid for all kinds of fish and the total value is thereby greater.

Weather conditions were ideal for winter fishing in Saskatchewan during the 1918 season, and despite the influenza epidemic, which interfered with operations and caused numerous deaths amongst those engaged in fishing, reports from the various districts show that in the northern part of the province especially the fisheries were very successful. It is reported also that the fish in many of the lakes that have been fished for some years have improved in size and quality, as a result of the thinning out of the supply which, in some cases, was greater than the lake could well sustain.

Both the catch and the size of the fish at Lesser Slave lake, which provides the chief fish supply for the province of Alberta, were satisfactory. A feature of the year's operations was the fishing of several lakes in the north which had not previously been fished commercially. Some of these are over a hundred miles from the nearest railway, and, as can be well imagined, transportation of the fish to market is a difficult and expensive undertaking.

In Southern Alberta angling was not so good as in the preceding year owing to the lack of rain and the drying up of a number of the smaller streams.

#### PACIFIC FISHERIES.

##### *Salmon.*

The salmon fishery, as a whole, during 1918 was successful. While certain kinds of salmon were not very abundant in some sections of the coast, other varieties appeared in greater quantities in other sections.

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In the southern district, which is practically the Fraser River district, the failure of the big run of sockeye in 1917 was followed by a small pack in 1918. Other varieties were much less abundant than was expected. The total pack on the Fraser was, therefore, smaller than that of the preceding year.

In the northern district which extends from Smiths inlet to Naas river, and includes Queen Charlotte islands, the aggregate pack of salmon greatly exceeded that for the year 1917. Sockeye were plentiful in the Skeena river, but in Rivers inlet the run of these fish was poor. Spring salmon fishing was very good, and the results equalled those of the good seasons of five or six years ago. The varieties known as pinks and chums were very abundant all over the northern district, and prices were high.

In the Vancouver Island district, which covers the whole island and part of the mainland adjacent to the north end of it, fishing operations on the whole were very successful. Salmon fishing was very good, especially off the west coast, and a largely increased catch was landed. Chums were in great abundance.

Trolling for salmon with hook and line has become very popular all over the coast. Besides being an inexpensive method of fishing it is very remunerative. For that reason, the number of those engaging in it has increased enormously in the last year or two.

*Halibut.*

The halibut fishery suffered to some extent through the influenza epidemic, which disabled the crews of most of the vessels for a time. Notwithstanding this drawback the combined catch of Canadian and American vessels was looked upon as very satisfactory. Fishing operations were carried on in Hecate Straits and off the west coast of Queen Charlotte islands by the smaller vessels of the fleet, but the larger boats operated in the Gulf of Alaska far to the northward.

*Herring.*

The herring catch was very much greater than in the preceding year, and greater quantities were canned and pickled. These fish were extremely abundant in the Barclay Sound district on the west of Vancouver island; they appeared early and remained in abundance all through the season. Nanaimo harbour and the neighbouring bays and inlets on the east coast of the island were filled with herring early in the winter season, but little attention was given to catching them until the season was well advanced.

*Other Sea Fish.*

Pilchards were taken in large quantities on the west coast of Vancouver island, and more than ever of this delicious fish were preserved in cans.

The catch of black cod would appear to be not quite so large as in the preceding year.

Steam trawling was successfully carried on by two trawlers off the northern coast of the province, and good catches of excellent flatfish were secured throughout the year.

*Whales.*

One whaling station only, operated on the west coast of Vancouver island, but the catch, 246 whales, was almost as great as that of the preceding year when two stations were at work. The whaling stations at Rose harbour and Naden in the northern district were operated successfully also, and the total catch of the three stations was 500 whales.

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It is interesting to learn that nearly 30,000 cases of whale meat were packed, in the course of the year, and sold in a ready market.

## REMARKS.

Four steam trawlers operated out of Atlantic ports and two out of Pacific ports during the year, with marked success, and indications point to further developments in this respect.

Line fishing, too, has progressed, and larger motor boats of a size capable of fishing on any of the nearer Atlantic banks have taken the place of the old medium-sized sailing vessels, in many places.

The very hazardous nature of the fishing industry is evidenced by the annual toll of human lives paid by those who carry it on, and I regret to say that no fewer than 47 men, 28 on the Atlantic and 19 on the Pacific, were lost to us while prosecuting their calling during the year.

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In concluding, I desire to say that my thanks are due to the officers and clerks of the Fisheries Branch for their loyal co-operation with me in carrying on the work of the Branch; and, further, that their duties throughout the year have been performed in a most praiseworthy manner.

I am, Sir, your obedient servant,

G. J. DESBARATS,  
*Deputy Minister of the Naval Service.*

## APPENDIX 1.

## REPORTS OF INSPECTORS OF FISHERIES.

## REPORT OF INSPECTOR A. G. MACLEOD, OF SYDNEY, N.S., ON THE FISHERIES OF DISTRICT No. 1, NOVA SCOTIA, FOR 1918.

The season was rather unfavourable, on account of the late spring and unsettled weather, and the quantity of fish caught was less than it would otherwise have been, but prices ruled abnormally high. Consequently, the fishermen had a very prosperous year.

## LOBSTERS.

Owing to the drift ice remaining late on the coast, fishing operations did not begin along the northern part of the district until the 21st of May, at which time the great bulk of the spring herring had passed by, thus causing a great scarcity of bait, which was a serious handicap to the fishermen.

On account of the cost of lobster gear having advanced tremendously, the fishermen did not supply themselves with new equipment to replace that lost during the previous season. This, together with the unsettled state of the market and with fewer men engaged in the industry—many of the fishermen having enlisted for overseas—was the cause of the catch being lower than that of the preceding year; for, apparently, lobsters were fairly plentiful. At L'Ardoise, Richmond county, there was a decrease of 4,000 traps, and from Bay St. Lawrence to Neil's Harbour there were 4,060 traps less in operation than in the previous year.

## SALMON.

This branch of the industry was a failure all along the coast, with the exception of L'Ardoise, Richmond county, where good catches were made after the 15th of June. In the principal sporting river—the Margaree of Inverness county—during the fly fishing season, salmon were not up to the average; but they ascended in very large quantities in the fall, and the river was teeming with them in October and November.

## COD.

The high prices paid for cod caused more of our fishermen to engage in trawl line fishing to a greater extent than heretofore, which proved very profitable, especially at Ingonish, Victoria county, and Eastern Harbour, Inverness county. The fishermen of the former port reaped a harvest during the latter part of December, for cod of the largest size and choicest quality struck that coast in very large quantities—some of the fishermen having averaged \$45 per day.

## HADDOCK.

The catch of haddock fell behind that of the previous year, owing to the drift ice hugging the coast unusually late in the spring. At L'Ardoise, Richmond county, a trap net operating there did remarkably well in June.

## MACKEREL.

Large schools of mackerel appeared on the Inverness coast at a late date, but would not take the hook. The catch was lower than in 1917, caused, principally, by unfavorable weather and the epidemic of influenza which raged throughout this district at the time when the mackerel struck the coast.

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## HERRING.

Herring were very plentiful along the southern coast of Inverness, Richmond, and Cape Breton counties during the months of July and August, and were it not for unsettled weather and scarcity of salt, the catch would have been very much larger.

## VESSELS AND BOATS.

The condition of the fleet shows a great improvement over the preceding year, owing to the fact that many new craft have been added to the fleet and a better grade of engine installed in the old ones. At Ingonish, Victoria county, one vessel owned by Parkhurst Fisheries, Ltd., of Gloucester, Mass., was run down by another schooner and sunk, but no lives were lost.

## DEVELOPMENTS.

The catching of blackfish at Pleasant Bay, Inverness county, is a new branch of the fishing industry in this district. This fish is caught with the regular barbed pole used for swordfishing. After taking off the fat, the carcass is thrown away as a rule, but, in some cases, the meat has been fried and pronounced to be as delicious and palatable as beefsteak.

## LOSSES.

A storm of unusual severity swept along the Atlantic coast on the 14th of November, accompanied by a tidal wave which caused tremendous destruction, not only to wharves, stages and piers, but to fishing boats, nets, and even fish that had been packed away in fish houses. Great damage was done at Bay St. Lawrence, Cape North, Aspy Bay, New Haven, Neil's Harbour and Ingonish, Victoria county; and at Main-à-Dieu, Baleine, Lorraine, and Louisbourg, Cape Breton county. Total estimated loss \$54,000. I regret to report the drowning of one fisherman at New Haven, Victoria county, on the 14th November.

## NEEDED IMPROVEMENTS.

As the fishermen of Bay St. Lawrence, White Point, Aspy Bay, New Haven, Neil's Harbour, and North Ingonish, Victoria county, are operating at great risk to life and property on account of having no harbour, I would like to impress upon the department the great necessity of making provision for shelter to fishing boats at these ports, in order that the fishermen may equip themselves with larger boats, and thus be enabled to reach the best fishing grounds. In the district of Port Hood, Inverness county, the only place of safety for boats during fall fishing is at Port Hood island. Consequently, a large number of fishermen, chiefly from the southern end of the district, cannot take advantage of this shelter. Therefore, I would strongly recommend that the Government assists by constructing a shelter for their boats at the mainland.

## CLOSE SEASONS.

The close seasons have been well observed. I may say that the new system of appointing fewer guardians, with larger salaries, has been productive of very beneficial results. As smelts are late in ascending our streams for spawning, I would recommend that the close season be extended to July 31.

## ILLEGAL FISHING.

In order to prevent illegal fishing, the guardians are required to patrol at irregular intervals and perform their duties in such a manner that it is utterly impossible for any person to know where they may be stationed at any time. There were three prosecutions for attempts at illegal fishing in the Margaree river and convictions secured in each case, the offenders being fined \$25 each, with costs.

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## GENERAL REMARKS.

The regulation governing sawdust and mill refuse is carefully respected, for mill owners, as a rule, are desirous of affording every protection to the fish entering our streams.

The fishways in my district are in good condition.

There were no patrol boats in use in this district with the exception of two small motor boats supplied for the use of the special head guardians, Malcolm W. Ferguson, on the Mira river, and Pat. McDonald, on the Margaree river.

Two gaspereaux nets, two boats, and nineteen lobster traps were confiscated.

The following licenses were issued in my district: smelt gill net, 115; smelt bag net, 11; trap net, 81; lobster, 47; lobster extension, 23; angler's permits, 19; oyster, 81; mackerel canning, 1; haddock canning, 1.

## VICTORIA FISHERIES PROTECTIVE ASSOCIATION.

It affords me great pleasure to express to you my high appreciation of the faithful and invaluable services rendered by the active and competent secretary of this association—Mr. George Kennan, D. L.—for, with his hearty support and co-operation we have been enabled to procure greatly improved protection for the principal angling rivers of this district.

## REPORT OF INSPECTOR ROBERT HOCKIN, PICTOU, N.S., ON THE FISHERIES OF DISTRICT No. 2, NOVA SCOTIA, FOR 1918.

The catch of deep sea fish—cod, haddock, hake, and pollock—is estimated to be somewhat less than last year. Herring shows a considerable increase, and mackerel a slight decrease. The catch of halibut is much greater.

The quantity of salmon taken was slightly less than that in the previous year. On the Atlantic coast the fishery was nearly as good as last year; on the strait of Northumberland there was a greater falling off, while in the Bay of Fundy the reports indicate a considerable increase.

Over the whole district, we are confronted with the fact that the catch of lobsters was only about 25 per cent that of last year. On the strait of Northumberland the decline is about 50 per cent, and on the Atlantic coast about 25 per cent.

An unusual incident was the stranding of about one hundred and twenty large fish at Cape John, in Pictou county. They were from 10 to 20 feet long, the average being about 15 feet, and the weight of the largest about 4,500 pounds.

When the fish were seen on Tatamagouche bay, some parties went out in motor boats, which frightened the fish, causing them to swim towards the shore until they were grounded. Some of the fish which had turned seaward afterwards followed the school, until they also grounded. The best description I have of the fish is in an encyclopedia in which they are spoken of as the caaing whale, of which it is said that schools of 50 to 100 impetuously follow the leader ashore—when alarmed and surrounded—in a bay or fjord. It is recorded that 1,100 were killed in the winter of 1809 in Iceland. They have been called by various names, e.g., blackfish, pilot whale, etc. Very little use was made of the fish. The inhabitants were not prepared to render the oil, and most of them were used for fertilizer.

## PROSECUTIONS.

There were thirty-one prosecutions for violations of the Fisheries Act; two for fishing for gaspereaux out of season; seven for allowing sawdust to pass into waters frequented by fish; eighteen for fishing for salmon in close season; two for having

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salmon in possession in close season; one for neglecting to build a fishway. Convictions were secured in twenty-six cases. Twenty-two nets and two spears were seized for violation of the Fisheries Act, and confiscated.

The following licenses have been issued during the year: 1 lobster pound, 63 lobster canning, 20 lobster extension, 13 herring weir, 167 drag seine, 26 salmon net, 44 trap net, 1 fish cannery, 64 oyster fishery, 3 angler's permits, 81 smelt gill-net, 149 smelt bag-net, 1,160 lobster fishing.

## REPORT OF INSPECTOR H. H. MARSHALL, OF DIGBY, N.S., ON THE FISHERIES OF DISTRICT No. 3, NOVA SCOTIA, FOR 1918.

With regard to the condition of the fleet of vessels and boats, there has been a slight increase in the number of boats for the district, by the addition of a number of larger high power motor boats that are being used in fishing. There has been a slight decrease in the fleet of vessels, owing largely to the presence of a submarine on this coast, which sank eight of the fleet from Lunenburg alone, viz.: *Lucille M. Schnare*, *E. B. Walters*, *Uda A. Saunders*, *Potentate*, *C. M. Walters*, *Gloaming*, *Verna Adams*, and the *Elsie Porter*. The fishing schooner *Otokia* was lost with all on board on her way home from the Grand Banks. The remainder of the district remains about the same, and I am advised that arrangements have been made for the construction of five steam trawlers by Lunenburg parties during the next season. There have been a number of developments worthy of note in this district, such as the steam trawlers under construction, above noted. A five million pound cold storage plant has been constructed at Liverpool, Queens county, and I am advised that it is one of the finest of its kind in the Maritime Provinces. A large fish cannery is being constructed at Freeport, Digby county, by the Frank E. Davis Co., of Gloucester, Mass. This, I believe, is one of the most up-to-date, and will be capable of handling a large output. There have also been quite a large number of additions to other canneries in this district.

There have been very few offences reported, and the close seasons have been quite well observed. This may be largely accounted for by the presence of the patrol boats, as we have had a very active patrol, the operations of which have been very satisfactory for the season.

Very little trouble has been experienced with the mills on our rivers and fishing streams from sawdust and mill refuse, as the regulations respecting this matter have been generally well observed.

With respect to the fishways in this district, they are all reported as efficient as they ever were, and all in operation. There are two new ones under construction, one at Lawrencetown, on the Annapolis river, and one at Charleston, on the Medway, which, when completed, I think will be satisfactory and efficient.

The following is a statement of the number of licenses issued during the 1918-19 season:—

Lobster packing.. . . .	44
Lobster extension.. . . .	30
Cannery licenses.. . . .	13
Special angling permits.. . . .	59
Smelt bag-net.. . . .	24
Trap-net.. . . .	68
Smelt gill-net.. . . .	50
Lobster pound.. . . .	10
Herring weir.. . . .	87
Scallop licenses.. . . .	221

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REPORT OF INSPECTOR S. T. GALLANT, CHARLOTTETOWN, PRINCE  
EDWARD ISLAND, ON THE FISHERIES OF PRINCE EDWARD  
ISLAND FOR 1918.

## LOBSTERS.

Fishing commenced May 6, and fair weather prevailed throughout the season, but owing to the scarcity of lobsters only a very few packers operated the whole season. It is thought that the extension of the lobster season in the fall of 1917 was partly responsible for the small catch in 1918.

## COD.

This fishing is carried on chiefly with trawls, and although the catch was somewhat below the season of 1917, increased values were realized in 1918, bringing the total value about the same.

There was an increase in the catch of haddock over that for last year.

There was a good catch of hake, and good prices were obtained.

## HERRING.

These were again scarce on this coast during spring, and great difficulty was experienced in procuring a supply for lobster bait, but there was a great increase in the quantity for August, and very high prices were realized.

## SMELTS.

The catch of smelts was about the same as in 1917, but the prices obtained were much lower than the prices realized in that year. This was partly due to mild weather and to transportation, which was altogether inadequate to carry the fish that was being offered. The result was that some of this fish was six and seven days on the road to the Boston market, and had to be destroyed on arrival.

## OYSTERS.

The catch of oysters was about the same as the season 1917, but values increased. The disease which last season killed the oysters in Richmond bay and Grand river has somewhat abated, and it is hoped that it has now run its course. In some parts of this bay and Grand river there was a fair catch of spat, and the small oysters seem to be developing naturally.

## MACKEREL.

I have to report a large increase in the catch of this fish, principally caught with nets. Increased prices were obtained so that the fishermen were well pleased with the season's operations.

There was a large increase in the catch of alewives, and a small decrease in the catch of trout, but an increase in value.

## LICENSES ISSUED.

Lobsters.....	181
Lobster extension..	49
Quahaug.....	38
Fish trap.....	7
Oyster.....	215
Smelt gill-net.....	211
Smelt bag-net.....	245
Fish cannery.....	14

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# REPORT OF INSPECTOR J. F. CALDER, CAMPOBELLO, N. B., ON THE FISHERIES OF DISTRICT No. 1, NEW BRUNSWICK, FOR 1918.

The year just closed was a very profitable one for practically all fishing interests. The efforts of the fishermen were, at least, fairly successful in all branches, and remarkably so in several. High prices were paid for all kinds, and the total value of the catch was greatly in excess of that for any other year.

Fishing vessels are fast disappearing from the district. More money can be made by fishing in large gasoline boats. Fishermen operate on all Bay of Fundy grounds in these boats, in many instances going as far out as the Grand Manan Bank. A splendid type of gasoline fishing boat is built in the district; these boats meet the fishermen's needs better than any other kind of craft, and while their number and efficiency are steadily increasing, as already stated, the sailing vessel is fast disappearing.

Gill nets are being introduced for the first time in the cod and pollock fishery. It is too early yet to form an opinion as to the effect of such operations.

The sardine herring season was a very successful one. A large catch was landed and sold at a good price. Unfortunately the packers were caught with large supplies of the canned product on hand when the armistice was signed, and as the price of canned fish has steadily decreased since then, the prospects for the coming season are not good.

Generally speaking, the close seasons were well observed. A few lobster traps were put out from time to time at different places, but they were soon located and destroyed by the patrol boats.

The principal illegal fishing that had to be contended with was the destruction of fish by means of dynamite off White Head, Grand Manan. As the pollock grounds there cover a very large area, a great portion of which is outside the three-mile limit, it is possible for more of this work to be carried on in spite of the best efforts of the most efficient officer. We have a splendid officer in Mr. Medley B. Green who patrols this area. He succeeded in catching three men engaged in dynamiting fish. They were prosecuted, convicted, and heavily fined. Such action had a splendid effect, for I do not believe any more dynamiting was done during the season.

The condition of the streams, in so far as sawdust and mill refuse are concerned, is better than it has ever been in the past.

The fishways were kept open as long as it was necessary. The one in the dam at Porter's Mill stream does not appear to be effective for gaspereaux. The fishway in the Cotton Mill dam at Milltown was taken out in order that needed repairs be made to the dam. A log sluice-way around the dam was kept open and well supplied with water; no doubt, the sluice-way was as effective as the other fish pass.

The following is a statement showing the number of licenses of various kinds issued in my district, during the 1918-19 season:—

Herring weir.....	799
Lobster pound.....	2
Cannery licenses.....	8
Permit to dig soft-shell or long-neck clams.....	54
	<hr/>
	864

# REPORT OF INSPECTOR D. MORRISON, NEWCASTLE, N.B., ON THE FISHERIES OF DISTRICT No. 2, NEW BRUNSWICK, FOR 1918.

There was an increase in the catch of salmon, and an increase in its value. The destruction of salmon by seals still continues at the mouth of the Miramichi river and bay. The run of parent salmon in the Miramichi river was greater than ever, and with the assistance of the hatcheries we have reason to believe that this fishery will hold its own. The regulations were well enforced and the patrol steamer *Hudson* did good work keeping those using drift nets outside the three-mile limit.

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I regret to report a serious falling off in the lobster fishery. The southern part of my district showed a greater falling off than the northern section. The second season in 1917 contributed in some measure, at least, to the falling off in 1918. As the southern district is now changed from June to August, thus making a close season of all July and part of August, it will, in my opinion, assist very much in saving the lobsters that come into shoal water and are not more than half full of meat during July and August. Another very important matter is the saving of the female lobster. The licensing of fishermen, the co-operation of the canners, whose sympathy we are gaining, and the strict enforcement of the regulations will assist in this fishery being saved. The regulations were more strictly enforced than in previous years. The canners who have large investments in this fishery realize that it is necessary for them to give all the assistance possible to the officers. With that assistance there may be some hope of this fishery regaining its former importance.

There was a large falling off in the catch of cod, haddock and hake, but owing to increased prices the decrease in value is small. The unfavourable weather conditions in the early part of the season is given by the fishermen as the cause for the decrease in catch.

There was a considerable increase in the herring fishery, both in quantity and value. This fishery is becoming important. There are still large quantities used as fertilizer, but fishermen are taking advantage of the increased market value and are giving their attention to salting these fish, which a few years ago were regarded as only fit for bait or fertilizing purposes.

There is a small decrease in the mackerel catch, in comparison with last season, which was largely due to weather conditions.

The smelt fishery has more than held its own. The market value to the end of December was good, but during January and February of 1919 it fell off 50 per cent. The fishermen during the year received extra high prices. This was a great boon to them at a season of the year when employment is not easily procured.

There was practically no fishing for bass on the northwest and southwest Miramichi river, which are the principal bass fishing districts in the winter season. The residents of these districts find it more to their advantage to engage in lumbering operations.

There was an increase in the catch and value of oysters, as compared to last year.

The following is a return of the various kinds of licenses issued in my district during the fiscal year:—

Salmon fishery licenses.. . . . .	429
Oyster fishery licenses.. . . . .	300
Oyster permits.. . . . .	41
Herring weir licenses.. . . . .	14
Smelt bag-net licenses.. . . . .	2,931
“ “ “ free.. . . . .	25
“ gillnet licenses.. . . . .	118
Bass gillnet licenses.. . . . .	53
“ fishery licenses.. . . . .	23
Lobster packing licenses.. . . . .	174
“ additional licenses.. . . . .	7
Quahaug fishery licenses.. . . . .	37
Fish cannery licenses.. . . . .	1
Lobster pound.. . . . .	1

## REPORT OF INSPECTOR H. E. HARRISON, FREDERICTON, N.B., ON THE FISHERIES OF DISTRICT No. 3, NEW BRUNSWICK, FOR 1918.

Without consuming a large part of my time and incurring a very large expense in the operation, by personal inquiry amongst the fishermen and special guardians, as opportunity offered, by correspondence with the fishermen and through the local

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officers, I have collected as nearly correct information of the catch as it seems possible to get. The following comparative statement shows a greatly reduced catch, but without a correspondingly reduced financial return to the fishermen, apart from the fact that the fishermen were required to pay a very greatly increased price for materials needed in their work, such as nets, boats and salt.

	Fish. (cwt.)	Value (boatside).	Value (marketed).	Value Materials.
1917.....	8,020	Not stated	\$45,622	\$50,074
1918.....	4,288 (approximate)	\$37,088	45,997	57,505

The total reduced catch amounts to well up to 50 per cent, confined very largely to two classes of fish: viz., shad and alewives.

Because of the closed period against taking shad—of which there were 1,148 cwts. taken in 1917—a considerable portion of the reduction is accounted for. The greater part of the balance of the reduced catch was caused by alewives failing to swarm in these waters, as they have for many years.

The very satisfactory and, in many instances, greatly increased prices received by the fishermen for those sold, and the increased value of those consumed by the fishermen themselves, thereby permitting them to dispose of very high-priced meats, gave the fisher folk very satisfactory financial returns. The order forbidding the taking of shad for four years struck our fishermen like a thunderbolt and was only little less of a shock to the consumers. Unaware of what was contemplated some of the fishermen had purchased new nets, beside all the old nets that were on hand—many of which will be of little value at the end of the closed period—and they felt somewhat aggrieved. We can only hope that shad will so multiply during the closed period that the public will see the wisdom of the step taken. If shad are given as good protection in the Atlantic Coast waters, on the United States side, as we are trying to give them in the harbours and St. John River waters, we should see a vast increase when the ban is again lifted. Otherwise, if we are protecting them and our friends to the south are getting the benefit of that protection, there will be another story. There was great disappointment among the alewives fishermen last spring. For some unaccountable cause the usual great quantities of this fish did not strike the inland waters of the St. John River system. While the run was on they appeared to be as plentiful as in other years, but it lasted only a week or ten days, about half the usual time, and about half the usual quantity was taken. The very satisfactory price received by the fishermen partly made up for the diminished catches. We usually have a run of alewives about the first of June, in some districts locally called the "June" run, in other districts the designation "Blue Back" is given them because of the colouring of that part of the fish. They were reported to have been very plentiful last spring, but they are not much fished for, being very difficult to cure for shipping purposes, because of their very oily nature. Quantities are taken for local use and smoked or pickled, and are very good, being preferred by some to the others.

I was agreeably surprised regarding the catch of salmon when returns were received from the different sections of my district. Reports reaching me, during the fishing, were somewhat discouraging. While there was a considerable shrinkage, about 12 per cent, it was not nearly so large as I feared. Conditions did not appear to be at all favourable for the fishermen, but were very much so for the fish. Because of two or three summer freshets necessitating the removal of nets for periods of a week or more each time, the fish had good opportunities for reaching the spawning areas. This condition did not apply so much to the district of Kings county, because

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of the greater expanse of water there. Salmon were ten days to two weeks later than usual in reaching the inland waters. A somewhat curious fact was the very limited number of grilse, the proportion being very small, and the large proportion of large fish, 15 to 25 pounds each. Because of the run being later than usual several licensed fishermen did not put their nets out, finding, with the shortage of farm help, they had no time to rig up their stands and give fishing any attention. Others fished for periods of two to three weeks only; poor stands, scarcity and expense of nets, and rush of farm work being the causes. A new salmon net is good for only one year in the St. John River water, and some renew the bag or detachable end twice each year. Otherwise, salmon—and St. John River salmon are exceedingly active—break through and pass on, perhaps to become entangled in the next net. The run of salmon in the Southwest Miramichi river was fair, a very much greater proportion of grilse being taken than in the St. John River waters. Compared with previous late years, fly-surface fishing on the Tobique river was very satisfactory, 100 per cent better than in 1917 and but for certain conditions, high water and lumber running through the pools, it probably would have been better.

The catch of pickerel, from reports received, equalled that of the previous year. This is the only fish taken altogether in nets, that is, taken to some extent the year round and this fishery is not prosecuted very vigorously.

Eel fishing appears to be on the decline, fortunately, it appears to me, because of the fact that they destroy the spawn of many of our more valuable fishes and cause considerable loss and trouble to the salmon fishermen, likewise for the shad fishermen—when this fishery is allowed—where the nets are set stationary. There was a fair proportionate increase in the catch of sturgeon, over last year. A curious feature noted in the returns was, of three licensed fishermen one took nearly the whole catch. These are all experienced fishermen and have used about the same stands year after year. It is not a case of one shutting out another, because the river is very broad where this fish is taken and such would be impossible with their short nets. A strange thing was that practically no spawn was taken in these fish; two of the men saying that they did not get any and the third that he got only 20 pounds in all his fish.

The very small number of applicants for whitefish (Baker lake) licenses caused me to wonder after these people had requested the Government to grant them this privilege, so I asked the local fishery guardian the cause. He stated that most of the nets owned by the fishermen were of an illegal size mesh, and that they knew they would be liable to seizure and confiscation, even if fished under license. Therefore, they did not take out licenses but took chances, with unhappy results in many cases. Judging by the number of nets seized and the size of the meshes of same, there appears to be good ground for the reasoning of the guardian. When I returned to the town of Edmundston I called upon the dealer who supplies the fishermen with most of the nets they use in Baker lake and asked him to purchase only three-inch mesh nets to supply these men with, in future, explaining to him the trouble we were having over the smaller mesh nets, and he promised to do so. I did not feel that I was interfering with his trade, as I felt that if they could not get the smaller nets they would just as readily buy the three-inch size, which is legal size.

From some sections of my district trout fishing was reported as not so good as in the previous year. This was noticeable in the northern districts and probably was due to an excessive amount of rain, which kept the brooks very full of water. The southern districts reported this fishery good as usual. Trout is an important article of diet to the people living by or near trout streams, in the open season. Frozen trout is retailing here (Fredericton, January, 1919) at 28 cents per pound.

Many sport fishermen, native and foreign, visit the subdistricts during the fishing seasons; several have expensive cottages, particularly about the shores of the lakes of the south subdistrict, and spend their holidays and week-ends there.

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I have not any local officers (overseers) in the districts of Kings, Carleton, and Madawaska counties nor in the subdistricts of Victoria county. My general report about covers conditions in these districts, excepting that I wish to note the fact of the very materially decreased catch of salmon in the St. John river in Carleton county, and the satisfactory increase in the Tobique subdistrict of Victoria county, where it was 100 per cent better than in 1917. In Carleton the net fishermen were badly put about because of sudden and heavy raises of water. They were compelled to remove their nets for longer or shorter periods to avoid having them carried away. From the same cause the fly surface fishermen in the Tobique subdistrict were, to some extent, adversely affected, but they had the advantage of the summer freshets bringing the fish along faster than when the water is low. I beg to quote the report of the Superintendent of the Tobique Salmon Club, Thomas F. Allen (with his permission), dated October 12, 1918: "We took for our season's catch 244 salmon and 8 grilse. I would put the catch of other parties on this river at 150 salmon. There was a very small run of grilse this year, the smallest ever, to my knowledge. We have the largest number of spawning fish at the head waters that we have had for many years. They went up during the high water. Very few members visited the headwaters this season. The fish will be carefully guarded until they spawn and leave for the sea." The protection given by the above club must be of considerable benefit to the salmon fishermen (net) of the St. John river and harbour. Considerable fishing material was seized and confiscated during the season. Twenty-four shad nets, 12 salmon nets, and 40 whitefish nets were among the lot, besides wire netting (set to bar the ascent of fish in smaller rivers), 7 anchors, several salmon spears, also a small quantity of whitefish.

Nineteen cases covering various offences against the Fisheries Act, and one for assault upon the officers, were prosecuted before civil magistrates. Five of these escaped the punishment that was due them, for want of direct evidence. One escaped to the United States, after his guilt was proven. Fines were paid with costs in more offensive cases. Fines and costs to be collected in two cases not yet arranged, and four less offensive cases, after being proven and the costs paid, the sentences were permitted to stand, pending future good behaviour.

A word regarding the method of appointing special guardians. From protective and economical standpoints, there can be no question as to the superiority of the present method over that formerly in practice. It places more responsibility on the inspector and, in some instances, it is difficult to fulfil the responsibility as one would like doing. The proper sort of men cannot be had for efficient patrol, in some sections, and unless the wage is made an inducement—and it takes a large wage now—it is difficult to secure good patrolmen and move them from one section to another, unless promised a fairly long job, as it is at this season that men can get plenty of work near their own homes, at good wages. It is only from the country districts that men qualified for this work can be had, and there does not appear to be a surplus of men, of any quality, in the country districts at present. My staff of local officers, formerly eight in number, now consists of six, and are not well arranged. Formerly I had 74 special guardians, such as they were. Last season I had 34, which is 50 per cent less, and notwithstanding a substantial increase in wages a very substantial sum was saved over the previous years, and the service was not less efficient, I think, and the poachers concluded that we were, at least, as active as usual.

The following licenses were issued by me, for distribution throughout my district, during 1918:—

Salmon fishery licenses.. . . .	93
Salmon net fishing.. . . .	101
Sturgeon fishery.. . . .	3
Bass fishery.. . . .	9
Whitefish net fishing.. . . .	4

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## REPORT OF INSPECTOR J. E. BERNIER, M.D., QUEBEC, ON THE SEA FISHERIES OF QUEBEC, FOR THE YEAR 1918.

Leaving Quebec on May 9, on board the *Princess*, the steamboat employed by the Dominion Government in the protection service in this district, I passed the entire summer cruising in the Gulf, without mishap except for the epidemic of influenza which swept over the entire district, with great severity, and carried off many victims. Fifteen members of our crew were attacked by the disease, beginning October 19, with the result that the vessel had to remain at Gaspé for three weeks. I reached Quebec on November 12.

During the entire season, an unaccustomed spirit of emulation and of interest in their work has prevailed among the fishermen, as a consequence of the high prices offered for fish, which had not been realized before. Thus, the general result, compared with that of the preceding year, shows an increase in value of about \$500,000. This must not be attributed, however, to increased quantities of fish, but rather to the fact that fish products have attained a higher price. In considering the general result, from this point of view, it is found that the catches of the past season have been more regular, but have not, on the whole, been better than those of the preceding year.

The conditions observed in the different sections of the Gulf Division are as follows:—

*North coast and Labrador.*—The most important fishery of this section is the cod fishery, which is carried on by means of hand-lines and "trap-nets." The trap-net has been in general use for a long time on the Labrador coast; while on the north coast, between Natashquan and Pointe-des-Monts, it has continued unpopular. However, the experiences of the summer have been so encouraging that many fishermen show a desire to use this new method of fishing, in future.

The fishing commenced later, but once the cod had reached the coast, they remained until the close of the season; and the greater part of the time, were close to the shore. At Moisie, they were even taken in the mouth of the river; at Natashquan and other places, several hundredweights were taken in the salmon nets; at Sheldrake and at Godbout the fish were taken by means of hand-lines, from the rocks on shore. To the east of Pointe-des-Monts, Overseer Comeau reports that the fish were met with in "phenomenal" quantities, in schools at the surface of the water, as far as the mouth of the Saguenay. It is remarkable that the cod, which used to be taken in abundance in the neighbourhood of the Saguenay, but had practically gone away for forty or fifty years, are now observed there in ever more considerable quantities.

The weather continued favourable for all fishing operations, and it was always possible to procure a sufficient quantity of bait.

The result of the cod fishery, on the north coast and the Labrador, shows an increase over last year. The result would have been even better if the fishermen had been able to obtain, in time, all the salt they required. It is estimated that the quantity of cod which, for this reason they lost or neglected to take, was about 8,000 hundredweights.

The salmon net fishery was slight and backward. It shows a decrease of about 25 per cent from that of the previous season, which was itself far from being good. However, I do not believe that this fact augurs ill for the future, for very considerable quantities of reproducing salmon were noticed on the spawning grounds, in the fall, and in all the rivers. The failure seems to be due to a natural cause. As a result of the lack of rain, the water in the rivers remained low until July. The salmon only approached the rivers in the latter part of the month, and in the month following; that is, when the net fishery had been finished. In any event, the failure could not be attributed to poaching on the spawning grounds during preceding seasons, for it is universally recognized that the inhabitants of this coast do not engage therein as formerly, since they derive much greater benefit through applying themselves exclusively to the cod fishery.

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*South coast (counties of Bonaventure, Gaspé and Rimouski).*—In this district, cod is the most important fishery; salmon, lobsters and herring are regarded as secondary in importance.

The beginning of the cod season was at nearly the same time as in the preceding year, and the fishery was followed with success until the end of the season. Bait was sometimes scarce and difficult to obtain, but the fine catches which were made in September and October amply compensated for the scarcity of bait. The general result exceeded that of last year, from the point of view of value, but did not equal it in quantity.

The lobster fishery gave practically the same results as in 1917, notwithstanding that the season was shorter, and that a storm on June 12 destroyed about one-third of the traps, which could not be replaced. It was stated everywhere that the lobsters were plentiful and of great size.

In this section, as elsewhere, the salmon fishery continues to decrease, without it being possible to determine the cause with certainty.

The herring fishery was normal, and equalled that of last year.

*Magdalen Islands.*—In this district as much importance is attached to the lobster fishery as to the cod fishery. The fisheries for herring and mackerel occupy second place.

The lobster fishery was prosecuted under unfavourable circumstances, owing to the fact that storms destroyed a large number of traps, but it nevertheless gave a result considerably higher than that of the preceding season. The observations which were made show that it continues to be good, and, contrary to conditions elsewhere, has a tendency to increase, since fishing in the lagoons has been prohibited. This fact now attracts the attention of the majority of the fishermen, who, as a result of the educational campaign recently carried on, recognize that it is in their interest to refrain from illegal fishing, and even to help in preventing it. The coast has been carefully patrolled, and the law has been observed in a satisfactory manner.

The cod fishery shows a decrease of about 25 per cent, the sole cause of which is the unfavourable weather conditions. The mackerel fishery, for the same reason, gave only 50 per cent of the previous year's catch. Herring was caught in abundance, but owing to the limited number of foreign fishing vessels which visited the islands, it was only possible to sell a small quantity for the ordinary purpose that is, for bait. On the contrary, thanks to the high prices of the markets for two years past, the fishermen are using the herring in another way, and are smoking them. Several large smoke-houses have already been built, with this end in view, and this new industry tends to assume large proportions.

In the entire Gulf Division it is noticeable that the fishermen begin to show interest in the improvements and the development which it is sought to realize in everything concerning the sea fisheries. They show more attention and more activity in their work. At the same time, they manifest a disposition to abandon certain old methods, and to follow more modern processes, which they try to adapt to the conditions in which they find themselves. If left to themselves the slow evolution which is going on can only become apparent after years of groping, while the example of vessels, of apparatus, of superior methods of fishing, and also of a little practical instruction placed within their reach, would assist them to more quickly change their primitive ways of fishing, and would place them in a condition to better appreciate the advantages of the field which they exploit only imperfectly.

This need of knowledge is, perhaps, more marked in my district than in any other, on account of its extent, the difficulty of communication, the scattered population, and other causes growing out of these. It appears reasonable to believe that it is useless to expect this district to show a greatly increased production so long as this first need is not fulfilled.

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The following is a statement showing the number of licenses of the different kinds issued during the year:—

Lobster packing (lobster extensions, 14) . . . . .	54
Herring trap-net . . . . .	46
Cannery licenses (other than lobster) . . . . .	2
Salmon fishery . . . . .	158
Cod trap-net . . . . .	329
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	590

### REPORT OF INSPECTOR J. A. HOWELL, SELKIRK, MAN., ON THE FISHERIES OF DISTRICT No. 1, MANITOBA, FOR 1918.

The catch of fish in Lake Winnipeg during the summer was good. In fact, fishing had to be stopped before the end of the whitefish season as the fishermen had caught the quantity allotted them, which quantity was 500,000 pounds more than the season of 1917, which I think was partly due to the number of fish deposited in the lake from the hatcheries, also to the strict enforcement of the law. The total licenses issued during 1918 were 364 summer and 540 winter licenses.

I find there is a large decrease in the catch of pickerel this year, which I cannot account for, as there were as many fishermen working as last year. There is also a decrease in the tullibee catch. This can be accounted for by the open fall; the fishermen could not get their nets in the water during the time the fish were running, as there was no ice. When the lake was frozen hard enough to go on the fish were gone. This, I think, is partly the reason for the decrease in pickerel also.

Thanks are due the fish dealers and the fishermen for the assistance they gave me on the lake in protecting the different fishing grounds from being polluted by dead fish and offal, and also by adhering to the fishery regulations.

The following is a statement showing the number of licenses issued in my district during the 1918-19 season:—

Special fishery . . . . .	904
Commercial sturgeon . . . . .	49
Settlers' permits . . . . .	37
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	990

### REPORT OF INSPECTOR D. F. REID, WINNIPEG, MAN., ON THE FISHERIES OF DISTRICT No. 2, FOR 1918.

Fishing during the year, on the whole, was about the same as last year, except sturgeon fishing which shows a slight falling off due to the high price of twine, which caused the fishermen to resort to baited hook fishing. There was a slightly decreased aggregate of all kinds of fish, but a considerable increase in value as a result of higher prices paid for all kinds. During the year there were 406 Settlers' Permits issued in my district, as compared with 168 last year.

I am pleased to state that the limit of catch placed on most of the lakes in my district has been well adhered to, and evidently gives satisfaction as it prevents overcrowding. We had a very late freeze-up last fall, and in some parts of my district fishing was an almost complete failure, but on account of many more licenses being issued it can be averaged as a fairly good year.

I have had only twelve prosecutions in my district during the year; of these, nine were convicted and fined various amounts, three were not proven. I have had assisting me during the year two overseers and two guardians.

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before any fishing was done there could hardly have been time to give these lakes the necessary exploration by the fishermen, which is needed before operations can be successful.

The following is a statement of the number of licenses issued during the season 1918-19:—

Special fishery.. . . .	1,369
Commercial sturgeon.. . . .	32
Settlers' permits.. . . .	406
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	1,807

## REPORT OF CHIEF INSPECTOR G. S. DAVIDSON, INDIAN HEAD, SASK., ON THE FISHERIES OF SASKATCHEWAN AND ALBERTA, FOR 1918.

A comparison of this year's figures with those for 1917 would lead to the opinion that this year's operations had fallen off in practically every respect. This, however, is not the case, this season's figures being only for commercial operations, whereas those for 1917 included the operations carried on under Domestic Licenses and Indian and Half-breed Permits. A study of this year's figures covering only commercial operations will show that the catch for commercial purposes only, is very little less than the catch for 1917 which included the total catch for all purposes.

The good reports from all districts of Northern Saskatchewan are very gratifying and show that the fisheries are proving to be a profitable source of revenue to those who are going into the fishing business on a large scale and are instrumental in opening up these large waters for fishing purposes.

In Southern Saskatchewan the operations are on a much smaller scale, Lowes Lake, the Qu'Appelle lakes and Katepwe Lake being the waters fished commercially. The catch in these waters shows very little increase from year to year, this being due to the fact that practically the same fishermen operate each year, few newcomers taking up fishing as a means of livelihood. During the past four years the Qu'Appelle lakes have been fished with nets of four and one half inch mesh in order to as far as possible get rid of the pike and tullibee. This, from reports, so far as pike are concerned, appears to have been successful. The tullibee do not appear to have been got rid of to any very great extent. Large quantities of whitefish fry have been placed in these lakes each year during the above period, and those which were planted at the first are now maturing. The fry were furnished from the Qu'Appelle fish hatchery and the work has been a great success. Whitefish fry were also planted in the Strawberry Lakes during the past year and, from the last reports received, are thriving.

In Saskatchewan a large increase in the number of prosecutions for illegal fishing is observed. During 1917 only five prosecutions were made; during 1918 there were no less than thirty-two. In every case a conviction was secured and a fine inflicted. But in some instances where the cases were tried before the local Justices of the Peace the fines imposed were somewhat inadequate to the offences.

Weather conditions throughout the province have this winter been ideal for winter fishing, and this no doubt has had a great deal to do with the good showing of the Saskatchewan fisheries. The epidemic of influenza hit the fishermen, both in Saskatchewan and Alberta, very hard, and many deaths occurred. Even with this handicap it may safely be said that the fisheries have gone ahead greatly since last year and give promise of even greater extension next year.

In the province of Alberta the closing of Lesser Slave Lake and Lac la Biche to winter commercial fishing, while not popular with a certain section of the fishermen, gave these lakes a much needed rest, and caused the fishermen and fish companies to look elsewhere for their fish. This led to the opening up of a number of lakes lying to the north of Lesser Slave Lake, to reach which it was necessary in some cases to cut roads in to the proposed fishing grounds. Reports from these lakes are to the effect that the operations have not been generally successful; but as it was late in the season

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cessful. Therefore, it is somewhat too early to definitely state that these lakes cannot be fished profitably. It would take at least two season's fishing to learn what might reasonably be expected from them. I am of the opinion that the present rules in force in connection with fishing at Lesser Slave Lake are the best we have had to date and could with advantage be kept in force during the season 1919.

A new fishery was opened at Buffalo Lake, situated in the province of Saskatchewan, and it was at first thought that it could be handled to the best advantage from the Saskatchewan side. Orders were issued that applications should be made through the Inspector of Fisheries for Saskatchewan, and that only those eligible for Saskatchewan licenses should be granted licenses. It was later found that the catch would all have to be shipped out from a point of the Alberta and Great Waterways Railway, in the province of Alberta. Thereupon this lake was, for the present season, placed under the administration of the Alberta inspector for northern Alberta, with the provision that applicants from both the provinces of Alberta and Saskatchewan were to be granted licenses, and that the waters were open to all for fishing purposes. To reach this lake it was necessary to cut a road for some eighty miles from the shipping point to the lake. This work was started late and for a time was at a standstill owing to the road gangs being all laid up with influenza. Owing to the late start of operations it has not been possible to get any accurate report of the catch from this lake, as none of it had been brought out when the year ended. Acting Inspector W. H. Bell is under instructions to make a personal trip to Buffalo Lake, for the purpose of looking into the operations and seeing that the regulations are being observed and that the fishing ceases on the proper date. This district will be fully reported on in my next year's report. I am under the impression that it will show that there is a very successful new fishery in operation.

In the province of Alberta twenty-eight prosecutions were made, as compared with twenty-five the previous year. This is, however, not an indication that there was not more illegal fishing, as many seizures of excess and illegal gear were made, especially in Lesser Slave Lake, for which no owners could be found. I may mention that in one case no less than eleven hundred yards of net were seized; it was weighted so that it was concealed below the water; it was found by dragging operations. Though at the present price of nets, eleven hundred yards is worth considerable money, no person came forward to claim it.

Experiments were made at Lesser Slave Lake with a pound net, to find out if it was possible to clear out the pike without danger to the whitefish. It was found out that this could not be done, and the experiment was stopped. A similar attempt at Lac la Biche, where a drag net was used, was a success; large quantities of pike being taken.

During the past year the Canada Food Board set prices for fish and made several orders, all of which worked out well in practice. The object of sufficiently providing for the home demand for fish of all kinds before the export of fish was allowed, has certainly worked out in the case of Alberta and Saskatchewan. Such assistance as was needed by the officers of the Canada Food Board from our fishery officers and guardians was given; the work between our men and the Canada Food Board being done in a most harmonious manner.

The following is a statement showing the number of licenses of the different kinds, issued in each province during the 1918-19 season:—

<i>Saskatchewan.</i>	
Commercial and fisherman's .....	843
Commercial Sturgeon .....	6
Domestic sturgeon .....	14
Domestic fishery .....	213
Indian and Half-breed permits .....	653
Special angling permits .....	15
	<hr/>
	1,744

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## Alberta.

Indian and Half-breed.....	267
Commercial and fisherman's.....	986
Domestic fishery.....	204
Cannery.....	1
Special angling permits.....	4,338
	<hr/> 5,796

I am glad to be able to conclude this report by stating that the past year has been the most successful yet reported on.

### REPORT OF CHIEF INSPECTOR F. H. CUNNINGHAM, VANCOUVER, B.C., ON THE FISHERIES OF BRITISH COLUMBIA FOR 1918.

The condition of the fishing industry as a whole may be considered satisfactory, although in some sections there was a falling off in the run of sockeye, notably in Rivers Inlet. It is not possible to give any specific reasons for the decrease of this variety in this particular area, especially as so little is known of the life history of the sockeye after they go out to sea as fry or fingerlings. There has been no increased fishing in this area since 1910, seven hundred boats being the allotment, and the hatchery on Owekano Lake has turned out its usual quota of fry yearly up to 1918, in which year the collection of eggs was considerably reduced.

Some of the spawning streams are partially obstructed to the ascent of parent fish to their spawning grounds, but the removal of the obstructions is receiving attention, and the run of 1919 will have free access to the natural spawning grounds.

There was an increased run of both sockeye and spring salmon on the Skeena River; the run of the latter species being a very agreeable surprise, as it was feared that these were on the down grade. Fortunately, however, the fish appeared as abundantly as in 1912-13, notwithstanding the added tax which was put on this species by the more extensive trolling operations.

Pinks and chums were good all over the province. Climatic conditions were good; prices paid to the fishermen were increased, and so far as the actual fishing operations were concerned the salmon fishing industry as a whole may be considered as having been very successful.

The marketing of the finished article, owing to the war conditions of last fall, was not satisfactory. The greater proportion of red salmon, including pinks, was commandeered by the Government. Chums were not included and, as a consequence, there are unsold in the province, at the present time (June 1919), probably 250,000 cases. It is hoped, however, that with Peace terms signed and with the return of normal conditions an opportunity will offer for the disposition of this stock.

The fishing for chum salmon on the west coast of Vancouver Island, in the area from Cape Beale to Sombrio Point, was most successful. Practically half the catch was exported to the United States, where it was canned and ultimately marketed in the southern states. The exportation of so much raw material from the province has been the subject of serious consideration, and there is much to be said both in favour of and against exportation. Those in favour of continued exportation point to the fact that the price received by the producers is greater than that which they would receive if they only had the home market in which to dispose of their catch. Those opposed to exportation point out that they are unable to pack and successfully compete in the southern markets owing to the duty of 15 per cent. On canned goods exported to the United States. Again, traps and seines are much in vogue in the United States for all varieties of salmon, hence the better varieties are caught just as cheaply as other grades. This enables the American packer to pay a higher price for the raw product of the lower grades than the Canadian packer can afford to pay.

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This question was taken up fully by the Fisheries Commission of 1917, and it was recommended by them that exportation should be allowed to continue. It is, however, in the opinion of the undersigned, a trade worthy of further investigation, as it is certainly in the interests of this country that its raw material should be manufactured at home.

The run of salmon to the Fraser river was, for even an off season, very poor. It is hoped that the work of the International Fisheries Commission will result in regulations which will assist nature in bringing back this fine salmon river to its normal state of production. It is felt that this work would be greatly assisted if, when the parent salmon ascending the streams of the Fraser river watershed had passed the commercial fishing boundary, they were allowed to ascend to their natural spawning grounds without any molestation whatever, either by Indians or others. Arrangements should be made to supply the Indians with fish food from the commercial run before the fish pass out of the commercial area. If this were done there is no doubt that a great improvement could reasonably be expected.

Trolling for salmon as a commercial pursuit is gradually increasing. It gives the fisherman with limited capital an opportunity of entering the fishing industry on his own account, in a legitimate manner. The outlay is small and the returns are good. Some operators last season made from two to three thousand dollars. Spring salmon brought eight and nine cents per pound, and as high as 65 cents per fish was paid for cohoes. Of course, green hands could not expect to take up this phase of the fishing business and make such a complete success of it at the start. Like everything else, it needs experience, but it is an easy and legitimate way of fishing, and should offer good opportunities for returned soldiers whose condition calls for an outdoor life.

The favourite trolling grounds are around Langara Island, Dundas Island and Wark Canal, and on the west coast of Vancouver Island off Clayoquot and Barclay sounds, but there are other districts with more sheltered waters where trolling can be carried on remuneratively.

## HERRING.

The catch of herring shows an increase. Unfortunately, however, market conditions, following the signing of the armistice, were greatly changed. During the war the Canadian trade with the United States and Australia improved greatly owing to the lack of European supplies. This drew a number of inexperienced packers into the trade during the winter season of 1917-18, with the result that a large proportion of the output was badly cured. With the ending of hostilities and the expected immediate resumption of trading in herring with Europe, the demand for Canadian herring fell off in the United States and much of the poorly packed fish remained unsold.

## WHALES.

The whaling industry of 1918 was most successful. For the first time in the history of this industry in Canada whale meat was canned, nearly 30,000 cases being put up, and the commodity has found a ready market.

## HALIBUT.

The catch of halibut during 1918 was up to the normal average, and ranged in price from 15 cents to 20 cents per pound. Seven hundred and seventy-five cars of this species left Prince Rupert over the Grand Trunk Pacific Railway during the year.

There were the same complaints during the season of scarcity of bait, but two or three attempts were made by individuals to establish retaining ponds for herring which could be sold fresh as bait to the halibut fishermen. Reports indicate that this has proved successful and it will no doubt tend in a certain measure to relieve the situation.

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## REMOVAL OF OBSTRUCTIONS.

Whilst some work was done during 1918 in this direction, it was limited owing to the scarcity of labour and the desire to minimize expenditure as much as possible during the war period. Now that this necessity has been removed, the season of 1919 will end, it is hoped, with access to important and valuable spawning areas being freed to the spawning fish.

## FISH BREEDING.

The usual fish hatcheries were in operation during the season, and were successfully conducted. The number of eggs obtainable depends entirely upon whether the run of parent fish is large or small. To a small run, therefore, must be attributed the small number of eggs collected in the Rivers Inlet district this year. Operations at the other hatcheries were normal, and the reports from the officers in charge are to the effect that the spawning beds were well seeded.

## GENERAL REMARKS.

The war has affected the fishing industry in common with the commercial life of the country generally, and its close has brought many changes in pre-war conditions. Previous to 1914 there was little or no demand for canned pink or chum salmon. But with a world-wide food scarcity these varieties jumped into prominence, and they were easily disposed of. This increased demand induced those who were in the canning business to extend their operations in the canning of fall fish. It also induced others to participate in the industry. Consequently, the whole coast line of British Columbia is covered by licenses, and those now desiring to take up the fishing business as a means of earning a livelihood find that a location for a fishing area is very difficult to obtain.

To the returned soldier the fishing business appears to be very fascinating, for even before the fishing season of 1918 was closed applications for seining licenses for the season of 1919 were received from returned men. At the close of the year the applications had increased to an unexpected number and as under the existing licensing system only a limited number of seining licenses could be granted, the question of dealing with the increase was a serious matter. It must be remembered that the arrangements for the fishing season of 1919 would be made as early as the previous fall. This condition made it a most difficult matter to deal with the applications from returned soldiers without disturbing the whole producing life of the industry.

I am desirous of leading up to the question as to whether the time has not arrived when consideration should be given to a new policy covering the issuing of fishing licenses. At present a salmon purse-seine license covers a certain area, and the amount of fishing in that particular area will depend on the run of fish. If the run is large a number of fish can be caught without injuring the spawning grounds, but if the run is small intensive fishing takes place to the great detriment of the spawning grounds, as the operator feels the result of his operations must be equal to a fair return for the money invested. Are these restricted areas, therefore, in the interests of conservation? I have reached the conclusion, after mature deliberation, that they are not and that it would be in the interests of conservation and in accord with public opinion if these areas were largely increased and a number of licenses issued for the greater area over which all the licenses for that particular area would have the privilege of operating.

This is a suggestion, and consideration of the question might even tend in the direction of larger areas than is being considered at the moment. It appears to me that extended areas would be in the interests of conservation, as certain streams in the areas which show depletion would be benefited by the location of a proper fishing boundary without in any way interfering or limiting any one licensee's opera-

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tions as he would have all other portions of the area in which to operate, and the weekly close season would be based on the extent of the fishing operations carried on in the locality affected.

The number of licenses issued during the season of 1918 was as follows:—

Salmon cannery.. . . . .	92
" drag-seine.. . . . .	127
" purse-seine.. . . . .	122
" trap-net.. . . . .	24
" trolling.. . . . .	1,789
" gillnet.. . . . .	5,074
Herring purse-seine.. . . . .	62
" drag-seine.. . . . .	5
" gillnet.. . . . .	256
" trap-net.. . . . .	1
Abalone.. . . . .	1
Sardine and smelt.. . . . .	62
Miscellaneous cannery.. . . . .	18
" licenses.. . . . .	340
Sturgeon.. . . . .	5
Crab.. . . . .	32
Angling permits.. . . . .	33
Reduction works.. . . . .	11

I am pleased to say that the district inspectors and fishery officers have carried out their duties in a faithful and painstaking manner, and the fishery regulations have been satisfactorily enforced. The headquarters staff have had a very busy year, and have all performed their duties in an efficient manner.

## YUKON TERRITORY.

Special fishery licenses.. . . . .	30
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## APPENDIX 2.

The following is a statement showing the number of prosecutions, confiscations and sales, which took place in each province, during the 1918-19 season:—

	Prosecutions.	Revenue from Sales.	
Quebec.. . . . .	7	\$ 67 50	—
Prince Edward Island.. . . . .	30	254 10	\$ 193 00
Nova Scotia—			
District No. 1.. . . . .	5	75 00	1 50
" No. 2.. . . . .	31	437 76	19 80
" No. 3.. . . . .	23	90 50	38 05
New Brunswick—			
District No. 1.. . . . .	7	460 00	90 48
" No. 2.. . . . .	29	425 00	1,859 39
" No. 3.. . . . .	18	177 70	46 85
Manitoba—			
District No. 1.. . . . .	11	125 00	41 20
Saskatchewan.. . . . .	32	183 00	337 83
Alberta.. . . . .	30	198 85	467 90
British Columbia—			
District No. 1.. . . . .	41	311 50	2,136 35
" No. 2.. . . . .	35	1,102 00	131 79
" No. 3.. . . . .	19	1,275 00	1586 39
Yukon Territory.. . . . .			—
Total.. . . . .	318	\$5,182 91	\$6,950 53

## APPENDIX 3.

REPORT ON DRIFT NET FISHING OPERATIONS OF STEAMER  
*THIRTY-THREE*, 1918.

By J. J. COWIE.

Having been directed to fit out the steamer *Thirty-three* with drift nets, and send her to sea for the purpose of carrying on fishing operations for mackerel and herring during the summer of 1918, I now beg to report the results thereof.

In view of the quantities of mackerel taken in the few mackerel nets carried by the steamer during the month of June, 1916, it was decided to begin the season of 1918 by operating a full fleet of mackerel nets. The difficulty experienced by manufacturers in securing net-making material, however, owing to war conditions, made it impossible to get as many of these as were necessary. Between Boston and Gloucester, Mass., and Halifax, N.S., not more than half of a full fleet for a steam drifter could be secured.

The carrying out of some repairs in the engine-room kept the steamer in port till June 1, on which date she first sailed for the fishing grounds.

As in 1916, the vessel carried a crew of eight, including the captain, each of whom was called upon to help in operating the fishing gear.

The fish were sold in the port nearest to the fishing ground on which the vessel happened to be operating, and where buyers were found prepared to handle them. A receipt for the quantity bought by each buyer on each occasion, was duly signed and forwarded by the captain of the vessel to the chief accountant of the department, who in turn collected from the buyers the amount due.

My other official duties prevented me from being at the landing places of the steamer, and superintending the actual fishing operations therefrom. As far as it was possible to do so, general direction was given to the work by telegram or letter from Ottawa. It is somewhat difficult, however, to maintain close or regular communication with a fishing vessel mostly at sea in the night time, and at this port to-day and that to-morrow in the daytime. Consequently, the matter of deciding where and when to set the nets had, of necessity, to be left mainly to the man on the spot—the captain of the vessel—who, in any case, was in the best position to judge as to the movements of the fish.

The evidence afforded in 1916 that a successful drift net-fishery could be carried on when mackerel are moving eastward, along the coast of Nova Scotia, in spring or early summer, has been made clearer and more definite by the operations of 1918.

Ranging from about 25 miles southwest of Canso to 15 miles east of that place, thirty thousand pounds were taken at three hauls. That quantity should have been quadrupled with ease while the mass of fish was in the vicinity of Canso, but for apparent difficulty on the part of the crew in handling the fishing gear. On the first night at sea, the nets were set amongst what appeared to be a large body of fish. In setting, however, the twine was allowed to become twisted around the hawser, which put the nets entirely out of fishing condition that night, and caused the loss of valuable time unravelling them. The considerable catch secured on the third night at sea again caused loss of time clearing fouled gear and repairing torn nets. Later on, the gear was handled in a more efficient manner, but the chances of securing large quantities had become less with the breaking up and scattering of the main body of fish.

On June 18 the steamer passed through the Bras d'Or lakes to a position ten miles northeast of Sydney, in an effort to keep in touch with the moving fish. The nets were set there on the 18th, and at a point six miles of Ingonish on the 19th, and again, at a point 35 miles west of cape North on the 20th. The small quantities taken on each occasion would indicate that the big school had passed around cape North and into the gulf ahead of the steamer.

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Early in July, the mackerel nets were put ashore, and herring nets taken on board at Halifax to replace them. It was then decided by the captain to return direct to the gulf waters, without waiting to make a set off the coast of Halifax county, where he caught considerable quantities of herring in 1916. On the 16th of July a set was made midway between Cape George and Port Hood, but no herring were taken. On the night of the 17th what appeared to be a large body of fish was struck 11 miles northwest of Port Hood, where a catch of 40 barrels was secured. On the night of the 18th, at the same place, a haul of 60 barrels was made. These fish were of fine quality and in excellent condition for curing, kippering, or freezing for food purposes. On the following night, the nets were set at the same place, but not more than two barrels of herring, of inferior quality, were caught; thus indicating that the herring had moved away from that spot. Attempts were made later to get in touch with the school in that locality, but without success. Had there been half a dozen drifters at work nightly, instead of one, at as many different points between Prince Edward Island and Cape Breton, I am confident that contact with the main body of the fish would have been maintained all through July and August.

Keeping in mind the fact that this drifter caught 264 barrels of fat herring midway between the Magdalen Islands and Cheticamp, Cape Breton, from the 6th to the 20th of July, 1907, also that three fairly good catches were made between Cape George and Port Hood in July, 1915, when the vessel was under Dr. Hjort's direction, and further that the best catch of the season of 1916 was made in this same locality, it seems clear that a large body of herring of fine quality is to be found annually in that part of the Gulf waters, extending from Antigonish county northwards to the Magdalen Islands; and there can be no doubt that a small fleet of drifters, which need not be steamers, operating there could establish a regular summer herring fishery. It is exceptionally well suited for the prosecution of such a fishery. It is sheltered on three sides, and there are several good and conveniently situated harbours—such as Murray Harbour, Georgetown and Souris on the one hand, and Port Hood, Grand Etang and Cheticamp on the other. Moreover, it is practically free from the fogs that are prevalent on the open Atlantic coast.

At the end of the first week in August, the captain was ordered to operate in the Bay Chaleur, from Shippegan, N.B., but after two or three unsuccessful sets he returned to the waters between Prince Edward Island and Inverness county, Nova Scotia. Several hundred pounds of mackerel only were taken during August.

It is rather remarkable that herring of good quality and still full of milt or roe, were taken near Cape George, Antigonish county, as late as September 24.

In judging the results of the operations, it should be remembered that both herring and mackerel are seasonal fish, and can only be taken in quantities at certain places and at certain times of the year. Moreover, a single steam drifter, no matter how energetic and competent the master and crew may be, cannot be expected to sail out to a certain fishing ground and return with fish, in either large or small quantities, on each occasion, like a steam trawler. The drifter goes out after fish that are on the move always, near the surface of the water; whereas, the trawler operates for fish that are, comparatively speaking, stationary near the bottom, and which can be taken in more or less considerable quantities the whole year round.

A share of the gross earnings was allowed for distribution amongst the crew, as an inducement to prosecute the work with vigour and secure fish in quantities. Notwithstanding this, and after making due allowance for the erratic movements of the fish, the crew's incomplete knowledge of this method of fishing, and the discouraging effect of frequently hauling empty gear, it would seem that the operations were not pushed as vigorously as they should have been, after the month of July, especially. This may have been due, in some measure, to the presence of German submarines off the south coast of Nova Scotia.

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It would not be advisable, in my opinion, to continue the use of this vessel as a drifter. Her continuance, alone, at this work will add little to the knowledge we now have of the whereabouts of the herring schools, and the catching and landing of herring regularly and in paying quantities is no more likely to be accomplished on this side of the Atlantic than on the other by a single boat, even with the most efficient kind of crew on board. Success may be assured only by a fleet of several drifters, not necessarily expensive steam vessels, working together—the one acting as a guide to the other in locating and keeping in touch with the moving fish.

When the time is ripe and trade conditions warrant it, private enterprise will, no doubt, be found ready to create such fleets by converting some of the smaller gasoline codfishing vessels into herring drifters, for use as such during the summer herring fishing seasons.

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n  
FIFTY-THIRD

ANNUAL REPORT

OF THE

FISHERIES BRANCH

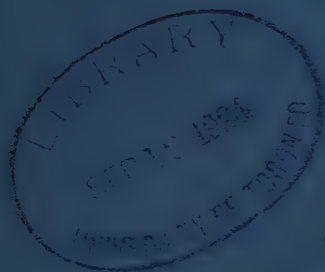


Department of the Naval Service

FOR THE YEAR

1919

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

THOMAS MULVEY

PRINTER TO THE KING'S MOST EXCELLENT MAJESTY

1920



FIFTY-THIRD  
ANNUAL REPORT  
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1920

WILLIAM L. BROWN

# FISHERIES BRANCH

1900-1901

1901

1901

*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O., etc.,  
etc., Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-third annual report of the Fisheries Branch of the Department of the Naval Service.

I have the honour to be,

Your Excellency's most obedient servant,

C. C. BALLANTYNE,

*Minister of the Naval Service.*

DEPARTMENT OF THE NAVAL SERVICE,

OTTAWA, June, 1920.



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## DEPUTY MINISTER'S REPORT.

To the Hon. C. C. BALLANTYNE,  
Minister of the Naval Service.

SIR,—I have the honour to submit the fifty-third annual report of the Fisheries Branch of the Department of the Naval Service, which deals with:—

- (a) International questions;
- (b) The various activities of the branch;
- (c) Proposed new activities;
- (d) Reorganization of the Outside Service;
- (e) The fishing operations of the year 1919.

Appendices to this report include the following:—

1. Reports of Inspectors of Fisheries.
2. Natural History Report.
3. Entries in Canadian Ports by United States Fishing Vessels.
4. Fisheries Expenditure and Revenue.
5. Summary of Prosecutions, Confiscations and Sales.

### INTERNATIONAL QUESTIONS.

While the oceans are commercially regarded as the great dividers of nations, from a fisheries standpoint they form the meeting grounds of the nations of the world. Hence from the earliest time, the fisheries have been a fruitful source of international problems, and in all probability, they always will be so.

### FISHERIES COMMISSION.

The work of the International Fisheries Commission, which was appointed in 1918 to consider a settlement of outstanding fishery questions between Canada and the United States, was explained in my report of last year. Substantial progress has been made following consideration of the report of the commission by the two Governments. On the 2nd of September last a treaty was signed at Washington for the joint protection, preservation and propagation of the sockeye salmon fishery of the Fraser River system. When this treaty was under consideration by the United States Senate with a view to ratification, it was discovered that under the wording of the final sentence of article 2 thereof, a person who had been tried and acquitted for an offence against the regulations in one country, if he subsequently went to the other, could again be tried for the same offence. As such a possibility is seriously objectionable, it was decided by the President of the United States to withdraw the treaty from the Senate for re-negotiation of this article. The amending article has been practically agreed upon and it is anticipated that the treaty will be ratified during the coming year.

Negotiations have also been proceeding towards the settlement of a number of questions regarding privileges, etc., of the fishing vessels of one country when visiting the ports of the other. These are matters which have been the cause of friction between the two countries ever since there was a United States. It will be remembered that they were temporarily settled by authority of an order of the United States Secretary of Commerce, issued by authority of the President, on the 21st of February, 1918, so far as the United States are concerned, and by an Order in Council of the 8th of March of that year, so far as Canada is concerned. The provisions of these arrangements are being maintained pending the outcome of the negotiations for a more permanent arrangement.

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## PELAGIC SEALING TREATY.

The Pelagic Sealing Treaty, which was signed on July 7, 1911, is demonstrating its efficiency from all standpoints. Following the ratification of the treaty, all commercial killing was prohibited on the United States and Russian islands for a period of five years, so that commercial killing, which was carried on to a small extent in 1912 before the close season became effective, did not again begin on the United States islands till the latter part of the season of 1917, and on the Russian islands until the season of that year. Under the treaty, Canada received from the United States an advanced payment of \$200,000 and \$10,000 a year for five years covered by the close season. These advanced payments have, however, to be recouped by the retention of a sufficient share of the skins that would otherwise come to Canada. Canada receives 15 per cent of the skins taken on the United States and Russian islands and 10 per cent of the skins taken on the Japanese islands. The total number of skins taken on the different islands for commercial purposes has been as follows:—

Year.	United States Islands.	Russian Islands.	Japanese Islands.
1912.....	3,764	nil.	139
1913.....	nil.	"	547
1914.....	"	"	537
1915.....	"	"	571
1916.....	"	"	nil.
1917.....	1,831	306	"
1918.....	34,890	no record.	550
1919.....	27,821	636	555

An accounting has not yet been completed with the United States, but keeping in view the prices at which the seal skins sold up to and including the sale of February last, and on the assumption that similar prices will be obtained for the skins that are still on hand, Canada will receive, for her share of the skins taken up to the end of 1919, after recouping the United States for the advanced payments, well over \$800,000 from that country, in addition to over \$30,000, for the unsold skins received from the Russian and Japanese islands.

## DEPARTMENTAL ACTIVITIES.

The year 1919-20 has been a busy one in the life of the Fisheries Branch, and has also been one of great importance; as measures—consideration of which had to remain in abeyance during the war—were effected, which clear the way for further action towards the encouragement of proper and speedy development of our fisheries.

The activities of the branch during the year, in the direction of the conservation, propagation, and increased commercial development of our fishery resources, and the maintenance of a high standard of quality in Canadian fish products, comprised the following:—

- Educational campaign among lobster fishermen and packers.
- Control and protection of fisheries,
- Fisheries patrol service,
- Publicity and Transportation Division,
- Investigations at biological stations,
- Natural history investigations,
- Fish culture,
- Oyster culture,

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Fish inspection,  
Inspection of canneries and canned fish,  
Drift-net fishing operations,  
Bait-reporting service,  
Fisheries statistics,  
Fishing bounties.

## EDUCATIONAL CAMPAIGN AMONGST LOBSTER FISHERMEN AND PACKERS.

This work was begun in 1918 and proved so useful that it was resumed this year. The campaign was under the personal direction of Doctor A. P. Knight, of Queen's University, who has been, for some years past, engaging in investigations into the natural history of the lobster. Doctor Knight organized the campaign for the season of 1919, but shortly before the work began he became ill, and unfortunately was unable to take further active part in it.

The campaign was carried on mainly during the spring lobster fishing seasons. Those engaging in it and the districts in which they were working were:—

1. Mr. Andrew Halkett, Naturalist of the department—Southern New Brunswick and a portion of the southern coast of Nova Scotia.
2. Rev. Doctor Macgillvary, of Kingston—Western Nova Scotia.
3. Professor C. J. Connolly, of St. Francis Xavier University—Cape Breton island.
4. Professor W. T. MacClement, of Queen's University—Northern Nova Scotia and eastern Prince Edward Island.
5. Professor H. G. Perry, of Acadia University—Queens and Prince counties, Prince Edward Island.
6. Rev. Professor Vachon, Laval University—Eastern and northern New Brunswick.

The results of this work are most encouraging. The different lecturers never failed to adapt themselves unhesitatingly to the local conditions. Hence, the work was not carried out according to any fixed method. Cannery managers, foremen, cannery helpers, fishermen and others interested were called together in halls, schools, etc., when addresses were given and discussions invited. Also groups were addressed in the canneries, on the wharves, etc., as opportunity might offer and in different instances, access to the churches was sought, when the guiding thought of the proper use of the natural gifts of the Creator was impressed.

The direct information given the fishermen and others interested has resulted in a much more general knowledge of the natural history of the lobster, and the need for its protection. As a consequence, the liberation, by the fishermen, of all egg-bearing lobsters found in their traps, is obviously becoming more general. The fishermen are discussing the natural history of the lobster, and the desirability, in their own interests, of affording it proper protection, to an extent they were not doing before, and such discussions are sure to be helpful. It also seems evident that the need for co-operation by the fishermen and cannery men with the department in protecting the industry is more generally realized.

This campaign was followed up during the winter, when the fishermen have more time at their disposal, by a series of addresses by Mr. Halkett. These addresses were illustrated with lantern slides, and as a general thing they aroused keen interest. Mr. Halkett's time was entirely taken up during the winter in western Nova Scotia, but it is the intention that he will resume such work on other portions of the coast during the winter of next year.

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## CONTROL AND PROTECTION OF FISHERIES.

The important work of the year in this connection is dealt with below under the heading, "Reorganization of the Outside Service." It is therefore considered unnecessary to make any remarks at this point.

## FISHERIES PATROL SERVICE.

The work of fishery officers on both the Atlantic and Pacific coasts in enforcing close seasons and other fisheries regulations, and in preventing illegal fishing, is supplemented by that of motor-boats and small steamers which patrol stretches of the coast where it might otherwise be difficult for the officers to put an effective stop to violations of the law.

Three boats, the *A*, the *B*, and the *F*, patrolled the waters of Nova Scotia from Lunenburg county westward while two boats, (the *C* and the *E*) were on patrol duty along the shores of Halifax and Guysborough counties and the Northumberland strait shore of the province. Some seizures of illegally set lobster gear were made, but on the whole the regulations were well observed.

Prince Edward Island waters were patrolled by the *D*, the *J. L. Nelson* and the *Richmond*, throughout the summer, and by the *Ostrea* and the *33* for a brief period in the fall. A determined attempt at fishing lobsters in close season was so successfully suppressed by the vigilance of the patrol-boat captains and crews that the *Ostrea* and the *33* found nothing to accomplish during their period of patrol.

In patrolling New Brunswick waters, four boats were employed in the Bay of Fundy, one in the Northumberland strait, and one at Miscou and Shippegan islands. Owing to the energetic efforts of the special patrol officer employed at Whitehead, Grand Manan, where it has been a common practice to dynamite pollock, no attempts were made to use dynamite last year. The *Phalarope*, the *G*, and the *Sea-Gull* did good work in destroying lobster traps; and it is noteworthy that violations of the lobster fishing regulations are becoming fewer each year. In the Northumberland strait, the *Hudson* was on salmon patrol duty for a time at Miramichi bay, and later did good work on lobster patrol and nipped in the bud the attempts at illegal fishing. At Shippegan and Miscou islands, formerly notorious for lobster poaching, the illegal fishing has been broken up, due largely to the good work of the *En Avant*.

The steamer *Loos* is used by the inspector of fisheries for the province of Quebec, in patrolling the waters of the gulf of St. Lawrence, and in visiting the widely separated points on the north shore, which would otherwise be almost inaccessible. At the Magdalen islands, a hired motor-boat, the *Waldren W*, was employed on lobster patrol duty.

The steamer *Bradbury* patrolled lake Winnipeg, and assisted in collecting whitefish and pickerel spawn for the fish hatcheries.

The following regular patrol-boats were on patrol duty on the Pacific coast during the year:

*Southern District* (comprising the Fraser river, Howe sound, and part of the gulf of Georgia):—*Merrysea*, *Swan*, *Foam*, *Elk*, and *Semiahmo*.

*Northern District*:—*S.S. Crosby*, *Hawk*, *Kayex*, *Merlin*, *Linnet*, *Bonila Gannet*, *Kingfisher*, *Babine No. 1* and *Babine No. 2*.

*Vancouver Island District*:—*Cohoe*, *Gull*, *Black Raven*, *Heron*, *Egret*, *Alcedo*, and *Fispa*.

Besides the regular patrol-boats mentioned, twelve chartered launches were employed for periods ranging from two to six months in the Northern District; and two chartered launches and one confiscated launch, in controlling the operations of Indians in the Southern District.

Several seizures were made, and the illegal operations carried on by Skeena river and Rivers inlet fishermen were greatly curtailed.

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## PUBLICITY AND TRANSPORTATION DIVISION.

In 1907 the department realized that if a demand for fish was to be built up in this country and the fresh fish industry developed accordingly, transportation facilities for fish had to be greatly improved and comparatively cheap rates made available. What the department did in such directions has been fully explained in previous reports, and need not therefore be repeated here. Suffice it to say that investigation left little room for doubt that the industry had attained such proportions that it could henceforth take care of itself so far as transportation charges are concerned. Hence, in August last, after due notice to those interested had been given, all such assistance was withdrawn as it was considered that from then on more effective work towards expanding the demand for fish generally could be done in other directions. This does not mean that the department will, in future, cease to give attention to more and more adequate transportation facilities being provided. On the contrary, close direct effort will be continued along such lines.

To enable the department to best serve the industry, a new division known as the "Publicity and Transportation Division" was added during the past year. An officer to take charge of this division was not secured until late on in the year, so that actual organization thereof did not begin until the 15th December last. Much has already been done through this division in the way of interesting the press of the country in giving attention to the great asset it has in its fisheries by affording space to articles containing interesting information about the fisheries and otherwise. Efforts are being made through this division to have the schools of the country give greater attention to our fisheries, and a contest has already been instituted among the pupils of domestic science schools—the future housewives—throughout the Dominion, in the use of fish. Prizes are being offered for the best original recipes. Also, an essay writing contest among the pupils of the schools generally is being organized with the object of arousing deeper interest in the industry.

When the organization of this division is completed and the situation sufficiently studied, it is felt that it will be able to do a great deal towards increasing the demand for fish not only in this country, but throughout the fish importing countries of the world. It already has taken over the work that was undertaken by the Canadian Trade Commission and it will co-operate closely with the Intelligence Branch of the Department of Trade and Commerce.

By co-operation with the publishers of the *Canadian Fisherman*—the organ of the Canadian Fisheries Association—and the Canadian Trade Commission, this department arranged for the issue of three special editions of the *Canadian Fisherman* to be placed in the hands of importers of fish in the different parts of the world. These editions were published in English, French and Spanish, in parallel columns, as one or the other of these languages can be read in practically every fish-importing country. Each of these editions was carefully prepared and reflects much credit on the editor of the paper. They were quite fully descriptive, both by printed matter and illustrations, of our Canadian fisheries, and contained lists of addresses of our fish producers with invitations to importers to get into direct communication with them.

## WORK OF THE BIOLOGICAL STATIONS.

The past season, 1919, has been the most successful one on record, as as there have been larger staffs of scientific workers carrying on investigations at both stations, and the work is now carried on all the year round and not merely during the summer months, as formerly.

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*St. Andrews Biological Station,*

The scientific staff in 1919 numbered in all twenty-one. There were:—

Professor Knight, Kingston, Ont.  
 “ Bailey, Fredericton, N.B.  
 “ Cox, Fredericton, N.B.  
 “ Connolly, Antigonish, N.S.  
 “ J. W. Mavor, Union College, Schenectady, N.Y.  
 “ Yachon, Laval University, Montreal.  
 Doctor Slater Jackson, McGill University, Montreal.  
 Miss Shanly, McGill University, Montreal.  
 Doctor Louis Gross, McGill University, Montreal.  
 Miss Mossop, Western University, London, Ont.  
 Miss Anderson, Fredericton, N.B.  
 Mr. Leim, Toronto University, Toronto.  
 Dr. W. G. Savage, Bristol England.  
 W. Savage, Bristol, England.

Dr. Huntsman and Professor Prince, and the permanent aids on the staff: Messrs. E. G. Rigby, A. E. Calder, M. Bartlett, and Miss Harris and Miss Rigby.

Doctor Klugh, Kingston, and Mr. D. A. MacKay, Science Master, Collegiate Institute, Ottawa, did important lobster and other work in New Brunswick and Prince Edward Island. Over forty fishery problems occupied the staff's attention, of which the most important were:—

(1) Investigation of lobster breeding grounds, St. Mary's bay, by regular dredging, beam trawling, shrimp trawling, seine and special traps at regular intervals weekly. The launch *Prince* was busy with these investigations from June to September, and collected also “plankton” and hydrographic material for study. Doctor Cox, Doctor Connolly and Doctor Huntsman took part. Doctor Mavor completed, at the same time, a study of water movements in the southern half of the Bay of Fundy.

(2) The shad fisheries, spawning grounds, resorts of young shad, food, movements, etc., occupied Mr. Leim from July 29 to September 3. The Shubenacadie and Annapolis rivers were specially studied, and Doctor Huntsman assisted Mr. Leim's work.

(3) A disease of the salmon near Campbellton, New Brunswick, was studied by Doctor Huntsman.

(4) The young lobster distribution in Richmond bay, Prince Edward Island, and other localities, occupied Mr. Klugh and Mr. A. D. MacKay, under Professor Knight.

(5) Deterioration of canned lobsters and other bacteriological fish questions were the subjects of research by Miss Shanley and Miss Macfarlane, both experts of high repute.

(6) The mussel as a new food, its culture, growth, etc., were questions laboriously investigated by Miss Mossop.

(7) Food of fishes, especially diatoms in the surface life of the sea, occupied Professor L. W. Bailey.

Valuable material for the study of specialists in various university laboratories was collected by the staff and was studied as follows:—

(a) Professor Willey, McGill.—Stomachs and food contents of plaice and other flat fishes.

(b) F. Johansen, Ottawa.—Life-history of sea perch or cunner, and its value as a new food fish.

(c) Professor Clara Benson, Toronto.—The flesh of skate, dogfish, etc., as food.

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(d) Miss Neff, Toronto.—The hake as a food fish and reasons for unsatisfactory refrigeration of the same.

(e) The late Prof. E. MacKay, Halifax.—Spoiling of canned lobsters and clams.

(f) Prof. Piersol, Toronto.—The flesh of the hake as a food (histological study).

(g) Dr. Clemens, Toronto.—The Mutton fish, a new food fish, and the ciscoes of lake Erie.

In addition to these lines of work, a committee was formed of representatives from MacDonald College, St. Anne; MacDonald Institute, Guelph; and the Domestic Science Department, Toronto, including Professor Clara Benson, Professor Annie Laird, both of Toronto, Miss Watson and Miss Hill; and reports have been already submitted by Dr. Benson and Misses McHenry and Martin on new varieties of fish upon the table and best modes of preparation and cooking.

The Biological launch *Prince*, under Captain Rigby, with Mr. A. E. Calder and Mr. D. V. Bourgeois, carried out the programme of observations in the Bay of Fundy during the winter months, and secured valuable information re the spawning and migrations of smelt, bass, tommy cod, etc., and taking temperatures and salinities.

Preparations for a course of biological and fish culture training for Dominion hatchery officers were made at St. Andrews, but the work was postponed until 1920. It was arranged also that Doctor Knight, Doctor Huntsman and Professor Prince should give addresses to the reorganized staff of fishery officers in the Maritime Provinces. Professor Prince gave twelve addresses in this connection in February and March.

### *Pacific Station, British Columbia.*

The Pacific Station was chiefly occupied with problems relating to the salmon, herring, various rock cods, etc., and with the solution of questions referred for report by the Fisheries Department. The station's launch *Orduna* made continual cruises to the various fishing localities, and much material for determining the occurrence, migrations and feeding and breeding habits of fish was collected. Professor J. J. R. MacLeod, of Toronto University, got ample material of fresh value for his researches, and Mr. C. Berkeley completed an important report on the bacteriology and chemistry of sea water in connection with fish life.

Doctor Fraser, in view of the shortage of university professors in British Columbia University, spent three months in Vancouver, giving university lectures in zoology at the request of the president, and with the sanction of the Biological Board.

The Museum and Library received valuable additions, and new apparatus and reagents for research were procured.

### *Publication of Reports.*

The board have nearly ready for issue the following publications:—

(1) Leaflets.—Popular leaflets for the information of the fishermen and the public on new food fishes, new effective baits for fish, causes of decay of fish, etc., have been completed by members of the staff.

(2) Bulletins.—In addition to a handsome bulletin on the "Canadian Plaice," three new bulletins will soon be issued, viz.: The Lumpfish, by Professor Cox; The Angler Fish, by Professor Connolly, and the Mutton Fish, by Doctor Clemens.

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(3) A new volume of "Contributions to Canadian Biology," 1919-20, includes fourteen reports, many of them of great and immediate practical use to the public; others of scientific value as aids to the conservation and expansion of the fisheries. The titles of the reports in the series are:—

1. Further studies on the Growth Rate in Pacific Salmon. *By C. McLean Fraser, Ph.D., F.R.C.S., etc., Curator of the Pacific Biological Station, Departure Bay, British Columbia.*
2. Some Apparent Effects of the Severe Weather of the Winter and Spring (1915-1916) on the Marine Organisms in the Vicinity of Departure Bay, British Columbia. *By C. McLean Fraser, Ph.D., F.R.S.C., etc., Curator of the Pacific Biological Station, Departure Bay, British Columbia.*
3. Temperature and Specific Gravity Variations in the Surface Waters of Departure Bay, British Columbia. *By C. McLean Fraser, Ph.D., F.R.S.C., etc., Curator of the Pacific Biological Station, Departure Bay, British Columbia.*
4. Experimental Cultures of Diatoms Occurring Near St. Andrews, N.B. *By Clara W. Fritz, B.A., M.Sc., Principal of East Angus Academy, Quebec.*
5. Plankton Diatoms: Their Distribution and Bathymetric Range in St. Andrews Waters. *By Clara W. Fritz, B.A., M.Sc., Principal of East Angus Academy, Quebec.*
6. A Contribution to the Biology of the Mutton Fish (Zoarces). *By W. A. Clemens, Ph.D., Assist. Prof. of Biology, University of Toronto, and Lucy Smith Clemens, Ph.D.*
7. Eastern Canadian Plankton: The Distribution of the Tomopteridae Obtained During Canadian Fisheries Expedition, 1914-1915. *By A. G. Huntsman, B.A., M.B., F.R.S.C., Biologist to the Biological Board of Canada.*
8. Eastern Canadian Plankton: Distribution of Floating Tunicates (*Thaliacea*) obtained during Canadian Fisheries Expedition, 1914-1915. *By A. G. Huntsman, B.A., M.B., F.R.S.C., Biologist to the Biological Board of Canada.*
9. An Investigation into the Rate of Putrefaction in the Commoner Food Fish Caught in and Around Passamaquoddy Bay. *By Louis Gross, M.D., Douglas Fellow in Pathology, McGill University, Montreal.*
10. Canned Sardines: The Causes of "Swells" or "Blown Cans." *By Wilfred Sadler, M.Sc., University of British Columbia, Vancouver, Canada.*
11. List of Fishes Collected in 1917 off the Cape Breton Coast and the Magdalen Islands. *By Philip Cox, Ph. D., B.A., etc., Professor in Geology, University of New Brunswick.*
12. The Diatoms of Canada. *By L. W. Bailey, L.L.D., F.R.S.C., and A. H. MacKay, L.L.D., F.R.S.C.*
13. The Utilization of Dogfish and Selachians. *By Prof. J. W. Mavor, Ph.D., Union College, Schenectady, N.Y.*
14. Hydroids of Eastern Canada. *By C. McLean Fraser, Ph.D., F.R.S.C.*

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## NATURAL HISTORY INVESTIGATIONS.

The Fisheries Naturalist of the Department, Mr. Andrew Halkett, besides taking part during the year in the educational campaign for lobster conservation, referred to above, carried out the following investigations:—

Lobster observations on the coast of the Bay of Fundy, N.B., and at the Magdalen Islands.

Investigations into the condition of scallops at Mahone Bay, N.S.

Observations on the metamorphosis of the scallop.

Identification of a collection of specimens from Hudson Bay waters, received from Rev. W. G. Walton, missionary at Fort George, Que.

Details in regard to these investigations and their results are to be found in Appendix-2 to this report.

## FISH CULTURE.

The fish cultural operations for the calendar year 1919 embraced the fresh-water and anadromous species only, and were confined almost entirely to the most important commercial food fishes, such as Atlantic salmon, in the east, whitefish, cisco, salmon trout and pickerel in the interior, and the Pacific salmon in the west.

The commercial species were practically all distributed as fry, after the food-sac was absorbed, on the natural spawning areas, and largely where such eggs were collected, but a small percentage was reared to the advanced fry and fingerling stages. The sporting species such as speckled trout in the east, and cutthroat and rainbow trout in the west, were hatched in small numbers, and after adequate return was made to the areas where the eggs were collected, were practically all distributed in public waters. A percentage was allotted to privately controlled or leased areas, on payment of nominal prices, and the distribution expenses.

The sockeye salmon hatchery on Stuart lake at the headwaters of the Fraser, which was closed in 1916, was reopened. It was filled to capacity with eggs collected in the Babine lake district on the Skeena, without any appreciable effect on the spawning areas of that district, as these were abundantly seeded, and there were more unspent salmon in the creeks where the eggs were collected at the close than at the beginning of the egg-collecting season.

The construction of a larger and more modern hatchery on Granite creek, Lakelse lake, was undertaken. This hatchery is to take the place of the old one that was put out of commission by floods in the fall of 1917.

The total distribution of all species was increased over that of 1918, by over 45,500,000.

The total collection of eggs in the east and in the interior, was not as large as usual, but the collection of the different Pacific salmon eggs largely exceeded that of recent years, and in addition, the spawning grounds of the British Columbia rivers, except the upper Fraser, were abundantly seeded.

There are 35 main hatcheries, 11 subsidiary hatcheries, and 6 salmon retaining ponds in operation. From these the total distribution of the different species in each province, during the season of 1919, was as follows:—

*Distribution of eggs and fry by Provinces, during 1919.*

Nova Scotia—		
Atlantic salmon.....	7,210,500	
Rainbow trout.....	83,000	
Speckled trout.....	330,000	
		7,623,500
New Brunswick—		
Atlantic salmon.....	9,482,305	
Speckled trout.....	348,600	
		9,830,905

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Prince Edward Island—			
Atlantic salmon.....	859,379		
Speckled trout.....	125,635		
			985,014
Quebec—			
Atlantic salmon.....	6,487,251		
Speckled trout.....	253,935		
			6,741,186
Ontario—			
Spring salmon.....	374,500		
Whitefish.....	276,710,000		
Salmon trout.....	31,746,850		
Herring.....	46,340,000		
Pickarel.....	177,150,000		
			532,321,350
Manitoba—			
Whitefish.....	297,975,000		
			297,975,000
Saskatchewan—			
Whitefish.....	59,039,000		
			59,039,000
Alberta—			
Atlantic salmon.....	154,574		
Rainbow trout.....	166,575		
Cutthroat trout.....	118,936		
Salmon trout.....	190,701		
			630,786
British Columbia—			
Atlantic salmon.....	320,000		
Rainbow trout.....	9,175		
Cutthroat trout.....	126,530		
Steelhead salmon.....	63,798		
Kamloops trout.....	1,198,300		
Sockeye salmon.....	54,443,875		
Spring salmon.....	2,722,960		
Coho salmon.....	3,952,819		
Pink salmon.....	40,000		
Chum salmon.....	383,000		
Speckled trout.....	17,052		
Whitefish.....	6,600,000		
			69,877,509
Total distribution.....			985,024,250

A detailed report on the fish cultural operations of the department is being published separately in pamphlet form.

The good effects of the fish culture service have become more and more manifest on all sides, with the possible exception, to some extent, of the sockeye salmon culture in British Columbia. But even in that fishery there is tangible evidence of its beneficial effects. Since the unfortunate depletion of the Fraser river, due to international conditions and railway building operations, the Skeena river is the most important salmon-producing stream in British Columbia. Two hatcheries, which have been propagating sockeye, have been in operation on this stream for some years. One of these hatcheries, which is located on a stream flowing into Babine lake, was placed where it is owing to the facilities the stream afforded for the operation of a hatchery, but the stream itself was not frequented to any important extent by salmon. After stocking this stream from the hatchery for some years, salmon now each year crowd into it in such large numbers to spawn that it is practically relied upon for filling the hatchery. Moreover, while for a long series of years the sockeye pack of the Skeena river had been going down, the decline ended in 1917, and during the past two years it has been rapidly recovering. Last season the sockeye pack there was 184,945 cases, or only about 2,000 cases less than the biggest pack ever put up on that river.

In the inland fisheries the good results are patent to all. Lake Winnipeg, the fisheries of which were in a seriously low condition some years ago, have been brought back, until now they are as productive as they ever were, the catch per net being as heavy as it ever was.

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In the Great Lakes until recently fish hatching has been largely centered in lake Erie and in lake Ontario. Twenty-five years ago lake Erie, which is the greatest whitefish producer of the Great Lakes, was regarded as practically depleted of whitefish. The Canadian catch that year was but 1,480 cwts., but by co-operative fish-breeding efforts in both Canada and the United States, not only have the catches been rapidly increasing, until now they are, one year with another, bigger than they ever were, but since 1903 there has been no close season on this lake. In 1915 the Canadian catch had risen to 18,322 cwts. of whitefish. There have been fluctuations since, due to weather conditions, and not to the scarcity of fish.

Lake Ontario twenty years ago was also regarded as depleted of whitefish, the Canadian catch that year being 1,291 cwts. Now it is second only to lake Erie, the catch of such fish there last year being 13,365 cwts.

Atlantic salmon are increasing in the streams that are being stocked. The more important rivers are being maintained at a high state of productiveness and salmon are coming back to various streams, as a result of stocking, from which they were practically absent for many years. Recently one of our enthusiastic sport fishermen wrote to the department that he spent the 12th and 13th of September on the Petitcodiac river, which was then at high water, and it seemed almost full of salmon. He stated that if the stream is properly protected it will, in a few years, contain as many fish as it did in the early days of settlement, provided of course that the placing of fry in it each year is continued for some years to come.

## OYSTER CULTURE.

The officer in charge of this service visited the various oyster beds in the gulf of St. Lawrence, cleaned such as required cleaning, and restocked others with young oysters.

From several oyster areas at Richibucto, N.B., 230 barrels of small oysters were taken, and planted in Brule harbour, N.S. Later in the season they were reported to be growing nicely.

The oysters planted in the Narrows below Richibucto during the preceding year were found to have lived and grown well.

While some young and healthy oysters were found in parts of Richmond bay, P.E.I., where the blight of a few years ago had practically killed off the stock, the conditions throughout the bay generally have not improved much, if any, and the officer in charge is unable to suggest any method by which improvement may be accelerated.

The beds at Shediac and Cocagne were examined and found to be in a very weedy condition. They were cleaned and raked. The Shediac beds especially would seem to require restocking, however.

## INSPECTION OF FISH.

The inspection of pickled fish and barrels was carried on during the season of 1919 by one inspector in Nova Scotia, two in New Brunswick, and by one, during the winter herring season, in British Columbia.

The sudden ending of the war in 1918 so upset markets for pickled fish that much of the herring pack of that year was carried over into the season of 1919. Part of it was sold for much lower prices than were anticipated when the curing was taking place, while part of it remained unsold throughout the whole of the latter year. As a consequence of these unsatisfactory conditions, and the

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high cost of barrels and salt, much less attention than usual was given to catching and curing herring during the 1919 season, and so the number of barrels of pickled fish submitted for inspection was smaller than in the preceding year.

The following shows the number of packers who submitted their fish for inspection and the number of barrels inspected annually since inspection was first made available.

Year.	Packers.	Barrels Inspected.
1915.....	16	1,320
1916.....	73	7,213
1917.....	80	8,977
1918.....	110	20,664
1919.....	82	8,730

Instruction was given in barrelmaking, and fish curing, by the inspectors during the season. The inspectors, on occasion, have had to make stencils, repair damaged barrels and even dictate the correspondence of some of those seeking advice.

It should be noted that the Inspection Branch extends its instruction beyond barrel making, and the packing of fish. For example, by the advice and under the supervision of this branch, two firms on the Gaspé coast erected smokehouses and started the smoking of fish last spring.

The Act under which inspection is carried on, which was passed in 1914, was designed to encourage improved methods of putting up pickled fish and the use of proper barrels. It does not, however, compel the use of improved methods. It simply provides that packers using proper packages and putting up their fish accordingly may have their packages and fish inspected, and if found to be in accordance with requirements, the former will be branded with a Government brand as a guarantee of the quality of the contents. While, as a result of this Act, and the direct instructions given by the general inspector and district inspectors of pickled fish, and the continuous efforts that were made to induce packers to adopt better methods, some progress has been made, it has been slow. Indeed, those interested are almost unanimously of opinion that before the standard of our pickled fish can be raised to the level on which it should be, it is necessary to compel packers to use proper packages and put up their fish according to proper methods. To this end a Bill to amend the Fish Inspection Act was introduced into the House of Commons and had its first reading on the 28th of March, 1919. It was then referred to the Select Standing Committee on Marine and Fisheries, for consideration, but unfortunately the time of that committee was so continuously occupied that it was unable to deal with the Bill. It is, consequently, proposed to take up the matter again during the next session of Parliament, when it is hoped that an amending Act will be passed.

It is considered well, however, to lay stress here on the fact that those engaging in the industry should not rely too far on legislation to encourage better methods. It is realized by the leaders in the industry that Canada cannot take the place that she should in the fish markets of the world unless her producers provide articles of standard quality. It is to be hoped that these leading producers will not only insist on first-class quality in all that they themselves produce, and will study the classes of curing designed to meet the tastes of the different importing countries and prepare their fish for such countries accordingly, but that they will do their utmost to influence the smaller producers on all parts of the coast to do likewise.

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## CANNERY INSPECTION.

During the canning season of 1919, the outside staff of fishery officers systematically inspected all fish and shellfish canneries.

This inspection is carried on under authority of the Meat and Canned Foods Act, and attention is given chiefly to seeing that buildings and utensils are in accordance with the standards laid down in the regulations; that fish undergoing the process of canning are sound, and fit for human food; and that the cans contain the weight of fish prescribed by, and are marked in accordance with the law.

There were in operation on the Atlantic coast, 544 establishments canning lobsters; two canning sardines; one canning salmon; four canning clams; and fifteen canning other fish such as mackerel, cod, and haddock.

On the Pacific coast salmon were canned in seventy-seven establishments; herring, pilchards, etc., in seven; and clams in one. In the Prairie Provinces lake fish were canned in one establishment.

In all, 1,882 inspections were made and reported on during the year, and while no very serious defects were found, a number of minor faults in buildings and equipment were noted and corrected.

## DRIFT-NET FISHING OPERATIONS.

As in the preceding year, the steamer *Thirty-Three* was equipped with herring and mackerel nets and sent to sea in the summer of 1919.

Operations began in the end of May, and continued till the middle of September, with intervals due to unfavourable weather, and the need for repairs to gear.

From May 27 to June 10 mackerel fishing was carried on in the waters ranging from Cape Sable to Cape Canso, and resulted in a catch of 17,530 pounds of mackerel.

From June 13 to June 25 mackerel fishing was continued in the waters between Inverness county and Prince Edward Island, when a catch of 25,795 pounds of mackerel was landed.

From July 6 to July 9, herring fishing was carried on off Halifax and resulted in a catch of twelve barrels.

From July 16 to July 20, herring fishing was continued off Port Hood, Inverness county, but only one barrel of herring and 319 pounds of mackerel were taken.

From July 28 to August 2, operations were carried on off North Sydney, but no fish were taken.

From August 8 to September 15 herring fishing was continued in Chaleur Bay, when 184 barrels of herring and 1,500 pounds of mackerel were taken.

The fish were sold in the port nearest to the fishing ground being operated on, where buyers were found prepared to handle the catches.

## BAIT-REPORTING SERVICE.

The bait-reporting service was instituted for the purpose of directing masters of fishing vessels and those in search of bait to where supplies might be available throughout the spring, summer and fall. Definite information is gathered by officers of the department as to the quantities of bait landed along certain stretches of the coast day by day. These officers send the information by telegram daily to certain ports, where it is posted up. The information is also published free by the Halifax daily newspapers.

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In the spring months telegrams giving information as to ice conditions and bait supplies were sent from the Magdalen Islands, Souris, P.E.I., Queensport and North Sydney, N.S., to Canso, Halifax, and Lunenburg, N.S.

During July and August telegrams were sent from Canso, Wine harbour, and Musquodoboit harbour, covering the coasts of Guysboro and Halifax counties, to North Sydney, Canso, Halifax, Lunenburg, and Shelburne, N.S. Also, from Lockeport to Halifax, Shelburne, and Barrington Passage, the latter for transmission by telephone to Clark's Harbour and Port Latour; and from Shag Harbour, Yarmouth, and Digby to Halifax, Shelburne, Lockeport, and Barrington Passage, N.S.

From September to the middle of November telegrams were sent from Campobello, N.B., covering information as to supplies of bait in the counties of Charlotte and St. John, N.B., to Digby, Yarmouth, Pubnico, and Barrington Passage, N.S.

#### FISHERIES STATISTICS.

Under an arrangement between this department and the Dominion Bureau of Statistics, the latter now compiles and publishes the annual statistics relating to the fisheries, as part III of its census of Industry. The information is secured partly from manufacturing establishments, on individual schedules designed to fit in with the Bureau's general scheme of securing industrial statistics, and partly by the officers of this Department, from those fishermen and dealers who are not classed as manufacturers, but who market their own produce. The returns from both the manufacturers and our officers are checked in this department, and afterwards handed over to the Bureau of Statistics for publication. A general review only, made up from information obtained by the department from time to time, is given in this report.

Monthly returns of the quantities and values of sea fish landed are sent to the department, as usual, by the officers in sea-fishing districts. The returns are checked and compiled to show the landings in each county and province, and in the whole of Canada. The compiled information is then summarized in a report by the department and made public through the press, monthly.

#### FISHING BOUNTIES.

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the eastern Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1919 payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton; payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$6.40 each.

To owners of boats measuring not less than 13 feet keel, \$1 per boat.

To boat fishermen entitled to receive bounty, \$4.10 each.

There were 13,068 bounty claims received, and 13,061 paid. In the preceding year 14,452 claims were received, and 14,440 paid.

The total amount paid was \$155,136.70, allocated as follows:—

To 749 vessels and their crews, \$52,990.05.

To 12,319 boats and their crews, \$102,146.65.

The following table shows in detail the payment of the bounty by counties for the year 1919:—

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Provinces and Counties.	No. of vessels.	Tonnage.	Average Tonnage	No. of Men.	Amount paid. \$ cts.	No. of Boats.	No. of Men.	Amount paid. \$ cts.	Total Bounty paid to vessels and boats, 1919. \$ cts.
<b>NOVA SCOTIA—</b>									
Annapolis.....	1	13	13	3	32 20	154	256	1,202 30	1,234 50
Antigonish.....	26	402	15	116	1,142 15	467	183	1,930 30	1,930 30
Cape Breton.....								4,035 70	5,177 85
Cumberland.....							5	23 50	23 50
Digby.....	6	164	27	50	483 10	354	601	2,818 10	3,301 20
Guyshoro.....	58	923	16	285	2,808 15	792	1,283	6,047 90	8,856 05
Halifax.....	66	1,032	16	306	2,987 10	1,292	1,734	8,400 50	11,387 60
Inverness.....	28	436	16	127	1,248 80	384	778	3,575 90	4,824 70
Kings.....	1	11	11	3	30 20	53	76	364 60	394 80
Lunenburg.....	145	8,815	61	2,316	23,626 65	536	639	3,155 90	26,782 55
Pictou.....	1	15	15	2	27 80	46	61	286 10	323 90
Queens.....	12	146	12	31	344 40	152	258	1,209 80	1,554 20
Richmond.....	41	737	18	208	2,065 50	470	810	3,791 00	5,856 50
Shelburne.....	32	669	21	220	2,073 55	551	1,078	4,970 80	7,044 35
Victoria.....	12	162	14	52	494 05	337	516	2,452 60	2,946 65
Yarmouth.....	29	1,209	42	388	3,689 20	119	262	1,193 20	4,882 40
<b>Totals.....</b>	<b>458</b>	<b>14,734</b>	<b>32</b>	<b>4,117</b>	<b>41,052 85</b>	<b>5,849</b>	<b>9,421</b>	<b>44,468 20</b>	<b>85,521 05</b>
<b>NEW BRUNSWICK—</b>									
Charlotte.....	9	117	13	25	273 00	382	636	2,985 75	3,258 75
Gloucester.....	243	3,517	14	1,056	10,268 75	162	381	1,724 10	11,992 85
Kent.....	7	72	10	17	180 80	44	72	339 20	520 00
Northumberland.....	2	34	17	8	85 20	2	4	18 40	103 60
Restigouche.....							11	50 10	50 10
St. John.....	1	14	14	3	33 20	16	27	126 70	159 90
<b>Totals.....</b>	<b>262</b>	<b>3,754</b>	<b>14</b>	<b>1,109</b>	<b>10,840 95</b>	<b>611</b>	<b>1,131</b>	<b>5,244 25</b>	<b>16,085 20</b>
<b>PRINCE EDWARD ISLAND—</b>									
Kings.....	8	138	17	26	304 40	395	556	2,674 00	2,978 40
Prince.....	7	99	14	28	278 20	406	938	4,242 70	4,520 90
Queens.....	2	24	12	4	49 60	116	253	1,153 30	1,202 90
<b>Totals.....</b>	<b>17</b>	<b>261</b>	<b>15</b>	<b>58</b>	<b>632 20</b>	<b>917</b>	<b>1,747</b>	<b>8,070 00</b>	<b>8,702 20</b>
<b>QUEBEC—</b>									
Bonaventure.....	2	26	13	8	77 20	876	1,569	7,306 20	7,383 40
Gaspé.....	7	76	11	25	245 85	2,977	6,098	27,966 40	28,212 25
Rimouski.....						83	131	578 80	578 80
Saguenay.....	3	45	15	15	141 00	1,006	1,831	8,512 80	8,633 80
<b>Totals.....</b>	<b>12</b>	<b>147</b>	<b>12</b>	<b>58</b>	<b>464 05</b>	<b>4,942</b>	<b>9,619</b>	<b>44,364 20</b>	<b>44,828 25</b>
<b>Grand Totals.....</b>	<b>749</b>	<b>18,896</b>	<b>25</b>	<b>5,342</b>	<b>52,990 05</b>	<b>12,319</b>	<b>21,918</b>	<b>102,146 65</b>	<b>155,136 70</b>

## PROPOSED NEW ACTIVITIES.

## PROPOSED SCIENTIFIC DIVISION.

At the present time the Canadian Biological Board is the only institution carrying on fisheries scientific investigations. While this board, particularly in more recent years, has been doing good work, it is a volunteer organization, and consequently cannot be expected to cope with the vast amount of fisheries research work that should be undertaken without delay. It is of primary importance that thorough investigation should be made to ascertain the migrations of fish, the causes of such migrations, the effects of different methods of capturing fish, the spawning places of fish, the haunts of young fish, the abundance of the organisms which supply food for fish, and to secure information on a great number of other questions. Also, close study should be made into methods of preservation of fish. While the preservation of fish by salting has been in practice for hundreds of years, little improvement in the methods has been devised, strange to say. Each year, large quantities of fish are either spoiled in curing or are of a low grade, owing to lack of knowledge on the part of those carrying out the operations as to certain causes and their effects.

Keeping in view the fact that at least 25 per cent of the weight of fish caught is unedible, but that this unedible fish can be converted by proper methods into oil of high grade, and into valuable food for stock, which in turn becomes food for man—as well as into unusually good fertilizer, to increase the crops on which stock feeds, it is a matter of great regret that up to the present no feasible means of handling fish offal so as to convert it into such products, has been found on the large portions of the coast, where the quantities produced are now comparatively small. It is obviously of great importance that close investigation be made with the object of finding some means, either by cheap concentration of the raw material at the places it is produced, and sending the concentrated article to a central plant to be finished, or otherwise.

As the waters of our Atlantic coast resorted to by our fishermen are also frequented by those of Newfoundland and the United States, and those on the Pacific coast by our own fishermen and those of the United States, such research work is of as much interest to these countries as it is to Canada. Obviously, it could be carried out most economically most efficiently and most expeditiously, through joint action by the three countries. Hence, steps have been started looking to the formation of a scientific council consisting of representatives of these three countries for the carrying out of such work. It is hoped that such can be effected during the year 1920-21.

To take direct charge of such work, it has been decided to add to the Fisheries Branch a Scientific Division. It is hoped that when this division gets into active operation, the trade will closely co-operate with it, and will not fail to make it a practice to refer to the department for thorough investigation any problems that may arise in their experience. Also, that they will always be ready to assist in proper investigations, by observing and tabulating such data as may be desired.

## PROPOSED TECHNICAL EDUCATION.

Prior to the war, the Fisheries Branch had desired to take up the question of technical education amongst the fishermen, embracing not only the better handling of fish, but also navigation, the operation, adjustment and effecting of minor repairs to gasoline engines, improved methods of fishing, etc. It was then found necessary to await consideration of the whole question of such education, in the light of the report of the commission that had been appointed to fully investigate the matter; but this was delayed by the war. It is, however, hoped that following the legislation of last year for the assistance of technical education, it will be found possible for at least the different provinces specially interested, with the federal aid available, to take up such work.

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Direct educational work amongst the fishermen and producers has, however, been given such attention as has been possible, and during the coming year it is contemplated that it can be expanded to an important degree, by direct instructions in the packing and curing of fish, and in the handling of fresh fish.

## RE-ORGANIZATION OF THE OUTSIDE SERVICE.

The previous service—with the exception of that in British Columbia, where reorganization was effected before the war—was merely a growth of the organization originally made following Confederation. It contemplated the employment of a large number of local officers who were not paid anything like a sufficient salary to enable them to devote their whole time and attention to their duties, and consequently, as a general thing, they were first of all farmers, blacksmiths, etc., and afterwards fishery officers. Besides while the salary was small, these officers, when using their own teams, were allowed to charge ten cents a mile for travelling. This resulted in much unnecessary travelling, which made the service on the whole an expensive one, though it was far from adequate. There were in the previous service some officers who were striking exceptions to the general rule and who were efficient to a high degree. It was a painful matter to the department to find it necessary that the employment of such men should be discontinued to enable a reorganization of the whole service to be effected.

Under the reorganized service, Canada—with the exception of Ontario and the inland waters of Quebec, where the fisheries are being administered by the provinces—is divided into three main fisheries divisions, the fisheries within each being similar in character. These divisions are:—

Eastern Division—consisting of the Atlantic provinces.

Prairie Division—consisting of the three Prairie Provinces and the territories north thereof.

Western Division—consisting of British Columbia.

Each division is placed under the direct supervision of a chief inspector. This officer is given extensive powers so that he can co-ordinate the whole service in his division to the best advantage by moving patrol-boats from one district to another as needs require, as well as by using the services of the overseers for certain districts in others at special times, etc.

Each province is, as heretofore, divided into district inspectorates, and these districts are again subdivided into overseers' districts, each of which latter, however, is made as large as it is practicable for one man to supervise by giving his whole time and attention to his duties. The overseers appointed for these districts were selected by the Civil Service Commission and were required to have qualifications that would assure efficient performance of their duties. They must devote their whole time and energies to their duties, and are also called upon to provide themselves, at their own expense, with horses and vehicles, and where needed, with motor-boats or canoes, for the maintenance of which a reasonable allowance, in addition to their salaries, is made; but no charges may be made for travelling in addition to the actual hotel expenses of the officers themselves. In the Eastern Division ninety-two overseer positions have been replaced by fifty-six.

The duties of the new officers will not be confined to preventing violations of the law. Following their appointment they were called together in groups and given a preliminary course of instruction on fish life, as well as on their administrative duties, and it is the intention to arrange for a course of instruction to them each year at a suitable time, covering fish life, curing and packing of fish, etc., so that they will not only be able to intelligently bring to the attention of the department the things that should be done to facilitate the industry, but will be helpful to those engaging in the industry in a direct way.

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It has, at times, been urged that Canada is spending too much in the protection of her fisheries, but an examination of the conditions will make it obvious that keeping in view the vast amount of work involved the service is being carried on in an unusually economical manner. It must not be overlooked that unlike most other countries having fisheries of importance, the Canadian federal authorities are responsible for the regulation and administration of the fisheries not only on our extensive sea coasts, but in all parts of our great Dominion, with the exception of Ontario and the inland portions of Quebec.

It must also not be overlooked that the Canadian inshore and inland fisheries, consisting of salmon, lobsters, smelts, whitefish, salmon trout, pickerel, etc., etc., make up at least half the total value of the fisheries of our country; and, from the nature of these fisheries, if they were not carefully protected, they would be depleted in a few years.

On account of the greater abundance of the fisheries and the greater density of the population, relatively more officers are employed in the Maritime Provinces than in any other part of the Dominion. An examination of the average size of the districts there will, therefore, give at least a fair indication of the protective service employed, and will show that it is no greater than experience has made it clear is absolutely necessary if an efficient service is to be maintained. Obviously it would be better to have no service than one that would not reasonably carry out the duties involved, as a waste of money would result.

Nova Scotia covers 21,528 square miles, and owing to its shape it has an unusually extensive coast line, all of which is adjacent to waters containing valuable fisheries. It also has a large number of splendid fishing streams and lakes. We have in Nova Scotia three district inspectors of fisheries and thirty-two fishery overseers, or an average of  $672\frac{3}{4}$  square miles of land to each overseer.

New Brunswick covers 27,911 square miles and possesses several large rivers, and a great number of smaller ones, as well as lakes. There we have three district inspectors and twenty-one overseers, or an average of 1,329 square miles for each overseer.

Prince Edward Island has an area of 2,184 square miles. It also is plentifully supplied with streams. There we have one inspector and four overseers, or an average of 546 square miles to each overseer.

As above indicated, in the western provinces the area under the supervision of each overseer is vastly larger.

These overseers are also charged to see that the coastal fisheries are carried on properly and that no illegally caught fish are landed. To assist them in doing this a Fisheries Patrol service has been found absolutely essential; but this patrol service also is as small as is compatible with efficiency. The Atlantic coast line is approximately 5,000 miles long, without taking into account the smaller indentations. We maintain there fifteen small patrol-boats and one fairly large steamer. Thus on the average, each boat has  $312\frac{1}{2}$  miles of coast to patrol. The steamer is needed to control conditions in the northern part of the gulf of St. Lawrence. On the Pacific coast there are about 7,000 miles of sea coast. There we maintained this year twenty boats, or an average of 350 miles to each boat. It is true that during the height of the salmon-fishing season eighteen additional boats were hired, mainly for short periods, but even with these, there was at that time an average of 184 miles for each boat.

While the reorganized service when it gets into proper working order will be a vast improvement in every way on the previous service, it will cost little if any more. It will relieve headquarters of a vast amount of detail that in the past has been so exacting as to leave too little time for consideration of constructive work, and, as previously indicated, it will therefore enable the branch to give greater attention to the devising and carrying out of measures for the general encouragement of the development of the fisheries.

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## REVIEW OF THE FISHERIES OF 1919.

The compilation of the statistics connected with the fisheries for 1919 has not been completed at the time of writing, consequently only an estimate of their total value and a general summary of the results of the year's operations can be given in this review.

The estimated marketed value of fish and fish products for the whole of Canada in the past year will be about \$58,000,000. This is less than that in the preceding year by about \$2,000,000. The falling-off in value is largely due to the very greatly reduced price paid for sardine herring in the Bay of Fundy, and to the diminished pack of chum salmon in British Columbia.

On the Atlantic coast weather conditions were quite favourable for fishing operations during the whole of the first half of the year, except in the last week of May, when a severe northeast storm destroyed a great many lobster traps and herring nets. In the second half of the year, short spells of bad weather occurred during July, September, and October. A heavy easterly gale in the first week of November wrecked or damaged many boats and much fishing gear, while a long stormy period in December seriously interfered with boat fishing.

On the Pacific coast the weather was rather unfavourable for fishing during the first half of the year, with the exception of the month of April. Good weather prevailed during the first three months of the second half of the year, but the final three months were characterized by rather unfavourable fishing weather.

## ATLANTIC FISHERIES.

*Cod, Haddock, Hake and Pollock.*

Along the south shore of Nova Scotia cod, haddock and pollock fishing was exceptionally good. In the Cape Breton Island district, owing to lower prices and more remunerative employment on shore, the cod fishery was not prosecuted so vigorously as usual. The catch of haddock at Ingonish was less than in the preceding year, but around Cape North, owing to the operation of more trap-nets, it was greater. The landings of two steam trawlers at Port Hawkesbury, however, made up for any slackness in line fishing in the district.

In the Bay of Fundy district of New Brunswick, the catch of cod and hake was good. Pollock were exceptionally plentiful at Grand Manan, but rather scarce at Campobello and Deer Island.

In the northern district of New Brunswick, which borders the gulf of St. Lawrence, cod, haddock, and hake were not landed in such large quantities as in the preceding year. Unfavourable weather towards the end of the season and the high wages offered for labour in the woods induced many of the fishermen to give up fishing earlier than usual.

In Prince Edward Island the result of the cod, haddock, and hake fishery was not quite so good as in the preceding year. On the coasts of Gaspé cod was scarce until the end of the season, consequently the catch was not so large as that of 1918. Cod appeared in very large quantities along the shore of Saguenay county from Natashquan westward, early in June, and good catches were landed. From St. Augustin eastward to Blanc Sablon ice remained on the coast till a very late date. After it left, cod appeared in large quantities for about three weeks and good hauls were secured.

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*Mackerel, Herring and Sardines.*

The mackerel fishery gave better results than in the preceding year. Very good catches were made in Digby basin and on the shore of Annapolis county in Nova Scotia. This had not been the case for a number of years. Mackerel were plentiful in the Cape Breton Island district; prices were good and those engaged in this fishery had a successful season. There was a slight increase in the catch in New Brunswick. The spring mackerel fishery at Magdalen Islands resulted in a somewhat smaller catch, owing to a storm at the beginning of the season, which did much damage to nets.

The herring fishery in Nova Scotia was not prosecuted with the usual vigour, owing to low prices and a poor demand, consequently the catch was less than that of the year before. Taken over all, the quantity of herring landed in New Brunswick was about equal to the previous year's catch. At the Magdalen Islands these fish appeared in normal quantities in the spring. The catch was not quite so large as that of the preceding year, but it was sufficient to supply all the needs of the lobster and cod fishermen for bait, and of the smoke-houses.

The sardine fishery of the Bay of Fundy during the season under review was a very unprofitable one for fishermen. Sardine herring were never more plentiful in the weirs, but the price at which the fish were bought made the season financially one of the worst ever experienced. The ending of hostilities in November, 1918, almost entirely stopped the demand for canned sardines, and when the season of 1919 arrived a large proportion of the abnormal pack of the preceding season was still unsold. Most of the canneries, therefore, remained closed until the season was half over and prices were paid at which fishermen could not afford to operate.

*Other Sea Fish.*

The landings of halibut and swordfish were greater than in the preceding year, but those of albacore flatfish and tomcod were rather less.

*Shellfish.*

The lobster fishery on all parts of the coast resulted in a catch that was very considerably greater than that of the preceding year. It must be remembered, however, that the preceding year's catch, mainly owing to much rougher weather, was little more than half the average annual catch of the four years which preceded it. The catch was exceptionally good on the New Brunswick side of the Bay of Fundy. In the Cape Breton Island district it was said to be a record one. Along the gulf shores of New Brunswick, and around Prince Edward Island, there was a greatly increased catch, notwithstanding destruction of traps by a gale at the opening of the season. The results on the Gaspé coast were equal to those of the preceding year, but at the Magdalen Islands there was a falling off in the catch as a number of fishermen considered the price insufficient and turned their attention to cod and mackerel fishing before the end of the season.

The quantity of oysters taken was slightly less than that in the preceding year. Clams of various kinds were taken in about the same quantity.

*River Spawning Fish.*

The total salmon catch on the Atlantic coast was 50 per cent less than that of the year 1918, which in turn was less than that of 1917. The falling off was equally pronounced on all parts of the coast.

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While the smelt fishery was not quite so good in the northern part of New Brunswick, the principal seat of the fishery, owing to unfavourable weather at the opening of the season, it was better than that of the preceding year on all other parts of the coast.

The total catch of alewives was rather less, but its value was greater, owing to higher prices. Shad were not so plentiful as in the preceding year.

## INLAND FISHERIES.

In the inland district of New Brunswick, which consists of the St. John River system, the catch of salmon for the season under review was said to be 25 per cent less than that for the preceding season.

The Ontario fisheries were not quite so good financially as in 1918. There was an increase in the catch of whitefish and of pike and a considerable increase in that of pickerel, but the quantity of trout taken was somewhat less, and of herring very much less.

There was an increase in the quantity of all kinds taken from lake Winnipegosis, Manitoba, during the winter season of 1918-19, but during the summer of 1919 the catch was less than half that of the preceding summer; pickerel, especially, being much less abundant.

In the northern district the total catch of all kinds during the winter of 1918-19, owing to a late start and fewer licenses having been issued, was less.

The summer fishery was practically a failure as a result of low water in the Saskatchewan river and tributaries, which prevented the collecting tug from reaching the fishing lakes.

The total catch of fish of various kinds throughout the province of Saskatchewan was not quite so good as that of the preceding year. While some lakes produced more others produced less, the increase or decrease in each case being due to a greater or smaller number of fishermen having operated. It is reported that none of the lakes show any sign of depletion.

In northern Alberta, there was a general increase in the production of fish. This was due to increased operations in lakes in which little fishing had previously taken place, to improved transportation facilities and to an increased local demand.

In the Yukon the run of salmon was not so good as in the preceding year, and the catch was small. In the Porcupine district, salmon fishing was a failure. The small run of salmon in the upper river is said to be due to the operations of a cannery at the river's mouth.

## PACIFIC FISHERIES.

*Salmon.*

The total pack of all kinds of salmon throughout the province of British Columbia was 1,393,156 cases, against 1,616,157 cases in the preceding year. The decreased pack was mainly due to a falling-off in the demand for canned chum salmon, and to an increase in the exportation of the fish in a fresh state to the United States.

In the Fraser river district, the pack of sockeye salmon was greater by about 12,000 cases. The total pack of all varieties, however, was considerably less owing to the causes mentioned in the foregoing paragraph.

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In the northern district as a whole there was a shortage in the salmon pack of approximately 100,000 cases. The diminished pack is chiefly attributable to the Naas river, Rivers inlet and Bella Coola sections. While the sockeye run was as good as ever in the Naas river that of all other kinds was a complete failure owing, it is said, to the use of traps outside the Pearse canal.

Sockeye in the Skeena river were more abundant than they had been since 1913. Spring salmon were not so plentiful, however, and the run of pinks and cohoes was a poor one.

In the Bella Bella section all varieties of salmon were fairly plentiful, and the pack was above that of the preceding season. In Smiths inlet there was good run of all kinds. At the Massett inlet, Skidegate inlet and on the west coast of Queen Charlotte islands, salmon fishing was poor; but, from Cumshewa inlet southwards, chum salmon were plentiful.

In the Vancouver island district, the total catch of salmon was greater than that of 1918. The total pack was less, however, owing to the great exportation of fresh chum salmon to the United States.

Trolling for spring and coho salmon was carried on by a greater number of fishermen and while the individual catches were not so large, owing to unsuitable weather, the aggregate take by this method was fully equal to that of the preceding year.

#### *Halibut.*

The halibut fishery was successfully prosecuted from Prince Rupert and the total quantity landed was greater than in the year before. It has to be noted, however, that the landings of American vessels account for almost two thirds of the total.

#### *Herring.*

Herring were very abundant in the vicinity of Nanaimo harbour, and in the Barclay sound district, during the winter season of 1918-19 and large quantities were taken. After the signing of the armistice, in November, 1918, the demand for pickled herring in the United States, the chief market for such, fell off. Consequently, the quantity prepared in that way was much less. There was again a large pack of canned herring, while the quantity drysalted for the orient very greatly increased.

#### *Other Sea Fish.*

Pilchards of excellent quality were abundant on the west coast of Vancouver island and a large quantity was taken, most of which was canned. The business of canning these fish is increasing year by year. The catch of black cod was about the same as that in the preceding year. The landings of flatfish increased by about 30 per cent while those of red cod increased by about 14 per cent.

#### *Whales.*

The Kyuquot Naden Harbour and Rose Harbour whaling stations were operated during 1919 and the number of whales landed was 432. No whale meat was canned.

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## GENERAL.

Unquestionably, good progress in the industry is being made. More care is being given year by year to the curing of our fish, and up-to-date methods of fishing are becoming more general.

Steam trawling has become firmly established on our Atlantic coast and, to a limited extent, on our Pacific coast. Drifting, particularly for mackerel, is beginning to take the place of anchored nets. Inshore fishermen are rapidly equipping their boats with motors so that they may, in a large measure be independent of wind and weather and so spend a great deal more time in actual fishing. In 1910 there were but 2,200 motor-boats used in the Atlantic fisheries. In 1919 the number had risen to about 12,000. For the whole of Canada the number is about 14,000.

I very much regret having to report that twenty-four men, seventeen on the Atlantic and seven on the Pacific—lost their lives in the prosecution of the fisheries, during the year.

In conclusion, I would express my high appreciation of the manner in which the officers and clerks of the Fisheries Branch performed their duties during the year.

I am, sir Your obedient servant,

G. J. DESBARATS,

*Deputy Minister of the Naval Service.*

## APPENDIX 1.

### REPORTS OF INSPECTORS OF FISHERIES.

#### REPORT OF CHIEF INSPECTOR, WARD FISHER, EASTERN FISHERIES DIVISION, FOR 1919.

Although I was appointed in August, 1919, under the reorganization of the outside fisheries service, as the chief inspector of the Eastern Fisheries Division, I did not actually take charge of the work until the latter part of November, and therefore had not been in a position to closely follow the operations carried on in the division during the whole of the year. I have had, fortunately, however, considerable supervisory experience as one of the inspectors for an important section of the division, and also for some years previous to the present appointment been engaged in an administrative capacity as an assistant to the general superintendent, and am therefore, not unfamiliar with the actual operations carried on, and the conditions affecting the fisheries of the division.

The division comprises the fisheries of the three eastern provinces, New Brunswick, Nova Scotia and Prince Edward Island, covering a seacoast of over 5,000 miles, and occupying a most strategic position from a fisheries point of view, as the waters are abundant with the chief commercial and food fishes. The number of persons employed in primary operations is about 38,000, and in canning and curing about 8,000, or a total of 46,000. The capital invested is over seven million dollars, and the marketed value of the catches annually for the past several years is about \$20,000,000. Therefore it can readily be seen that industrially and commercially as well as from an economic point of view, the industry is already of great value and offers as a natural resource one of the best opportunities for development.

The conditions under which the industry is carried on, and the product prepared and marketed, are rapidly changing, and consequently the reorganization of the administrative service was most timely, and should be potent for much good in connection with the regulation, conservation and expansion of the industry. Necessarily the working out of the reorganization in a satisfactory manner will occupy much time and attention, but with favourable conditions the prospects for a thoroughgoing betterment of the service are hopeful.

The general conditions affecting the fisheries during the past year have continued to be somewhat abnormal as a consequence of the conditions arising from the great war. Briefly, the following résumé of the principal fisheries, together with certain observations thereon, are presented.

#### (1)

##### LOBSTERS.

There was a very considerable increase in the catch throughout the whole division as compared with the preceding year. In Charlotte and St. John counties, New Brunswick, where a size limit of 9 inches has prevailed, the catch was the greatest in twenty-five years. Large increases were also notable for Cape Breton Island and Prince Edward Island. The pack increase was about 20,000 cases, and the prices received for the canned product were greater than any previous year. A portion of the pack was disposed of at \$50 and more per case of 48 pounds. While transportation, exchange, and the greatly

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unsettled world conditions appear to make the operations financially hazardous, the packers and dealers were again successful in gauging the demand for the product, and the ability of distributed markets to negotiate successfully for the product.

This industry demands the best possible protection, and every insistence should be laid on the observance of the regulations. The emphasis that is being placed on this requirement is having a good effect, and the regulations are being better observed than at any period since the rise of the industry. The investigations carried on by the department the past several years, and the educational features in connection therewith, have been of great value, and should be systematically continued.

The present regulations are, generally speaking, the most satisfactory yet devised.

## (2)

## COD AND HADDOCK.

The cod and haddock fisheries provide the chief food fishes, and offer fine opportunities for development. While the catches in Cape Breton Island, especially Inverness county, and also on the Nova Scotia side of the Bay of Fundy district, and on the coasts of New Brunswick and Prince Edward Island were not as large as usual, there was considerable increase in the catches landed on the Nova Scotia south shore ports, and also from the steam trawlers operating off Port Hood and Judique. The catch of the Lunenburg banking fleet was about 300,000 quintals, which is an increase of some 50,000 quintals over the preceding year. The prices of the dried product ruled high, averaging about \$12 per quintal.

It will be interesting to note that there has been little or no increase in the volume of the catch for some years, and this condition is generally deplored when it is pointed out that the markets can absorb a very greatly increased catch. It should be observed, however, that the deep-sea fisheries generally of the whole division, show a similar lack of expansion. Several considerations enter into the study of the situation:—

(1) Notwithstanding the very great improvement in small boat fishing, due to the replacing of the row and sail boat by the adoption of the modern motor-boat, there has been little or no increase in the number of vessels employed. Indeed, if it had not been for the operations of some five modern steam trawlers the catches of cod and haddock would have been insufficient to meet the demands of the fresh fish trade alone.

(2) The small prices secured for the fresh fish by the small boat and vessel fishermen affected the volume of the catch during the past year. While the cost of boats, gear and supplies, and also the cost of living has very greatly advanced, the prices secured by the fishermen on a large portion of the coast have increased only to a small degree. This has been true the past year in many sections of the New Brunswick and Cape Breton Island coasts, and has prevented a considerable number of the fishermen from diligently engaging in the work.

(3) The large stretches of coast without rail or steamboat facilities prevent advantage being taken of the best and most profitable markets. Also, the lack of adequate cold storage prevents the preservation of the catches to suit market and available transportation facilities.

On the other hand, it should be pointed out,—

(1) That our fishing population, even at the more advantageously located points, is not adequate to supply the demands for experienced fishermen, notwithstanding that at the favoured points the rewards of the industry are sufficiently great to tempt the enterprising and industrious. Such ports as Digby, Yarmouth and Lockeport find it difficult to steadily man the boats and vessels.

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Even Lunenburg, with its wonderfully prosperous slack-salted and dried fish industry, cannot greatly increase its fleet owing to the scarcity of men. Unless there is a rapid increase in the fishing population, and the building of winter fishing fleets, the industry can only be extended by the operation of additional steam trawlers.

(2) While it may reasonably be contended that the rate received by the fresh fish fishermen for the catches landed has not increased in proportion to the increase in operating expenses, it remains true that no single natural resource offers the workers better opportunities than does the fishing industry. The prices vary with the local conditions obtaining, and the fishermen who are located at points where there is little or no competition for their catches should be encouraged to either properly cure and market their catches; or,

(3) Cold storage facilities should be extended so as to avoid glutting the markets, and to enable the preservation of the catches until the market conditions are favourable for the disposal of the catches at good prices. For instance, the prolific deep-sea fisheries of Cape Breton Island cannot be very greatly developed until adequate cold storage is provided, and also until reasonably safe harbours and anchorages are constructed. The present catches, while large in volume and value, comprise a mere bagatelle as compared with the possibility of easy and rapid increase.

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## HERRING AND MACKEREL.

The above observations are pertinent to a large degree to the herring and mackerel fisheries. The catches of both species are larger than usual in many districts, especially in Cape Breton and Prince Edward Island. It should be noted that these increases were in the districts where the equipment was modern. It should also be noted that some districts reported that owing to the increase in the cost of supplies such as barrels and salt, the fishery was practically abandoned when sufficient catches were secured to supply the local demand for fresh and pickled herring. This condition is deserving of serious thought. The quality of the catches of Atlantic fish, suitable for pickling is as good as can be secured in the waters of any country, and it would appear extraordinary that with herring selling at from \$8 to \$14 a barrel, and mackerel as high as \$40 per barrel, that the comparatively small increase in the cost of salt, barrels, and other containers, should make it possible to profitably prepare the fish for market so as to take advantage of the high prices referred to, secured for properly packed and cured fish. When it is remembered, however, that as a rule our pickled herring and mackerel bring a much lower price than that received for the pickled product of other countries, the explanation is perhaps evident. But the query is obvious: Why is it that the prices secured for our pickled fish are often lower than similar products from other countries? The answer is that our fish are too often badly cured and badly packed, ungraded, in inferior packages, with the result that the product could not command the best prices, even when marketed under the most favourable conditions. Indeed, the conditions have been so bad that many dealers will not buy pickled fish for export in the original package, and packing is so inferior as to jeopardize not only the business reputation of the dealers, but also any possibility of profitable business. It is fortunate that during the past several years, the demand of the better class trade has resulted in the more reputable dealers insisting upon better methods, and consequently those dealers have no difficulty in disposing of large supplies at good prices. While the department has already endeavoured to improve conditions, there is much need of continued and systematic efforts, and it is hoped that regulations will be adopted governing the curing, packing and grading of mackerel.

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## HERRING SARDINES.

The sardine industry, which is carried on extensively in the Passamaquoddy Bay district, experienced the worst season in its history; notwithstanding that enormous quantities of the fish visited the coast, the demand, owing to the extraordinary conditions, was small and the prices extremely low. In 1918 an abnormal pack of canned sardines was made on both sides of the boundary line. The large pack was in a great measure due to the requests of the Governments of both Canada and the United States for increased production of fish foods. After the signing of the armistice the demand for canned sardines almost entirely ceased, with the result that the 1919 season found the packers with a large proportion of the previous year's pack on hand. As a result, most of the canneries did not open until about the first of August last year, when the season was about half over. Ruinous prices were offered the fishermen for their catches and with the limited demand and the extraordinary large run in the weirs it was comparatively easy for the packers to buy the fish at their own prices. Ten dollars per hogshead was paid at the beginning of the season, and few were taken even at that small price. Later in the season the price was dropped to \$5 per hogshead, where it remained for the balance of the season. When it is remembered that the prices the preceding year ran as high as \$70 per hogshead, it will easily be understood that the industry last year was conducted at a great loss to the fishermen.

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## SALMON, SMELTS AND ALEWIVES.

These species of anadromous fishes are growing in value and importance each year. The smelt fishery has a marketed value of over \$250,000, while the alewife fishery is steadily growing in importance, the pickled product bringing as high as \$14 per barrel. The salmon fishery the past year was unusually poor, particularly during the first half of the season, although great numbers ascended the rivers late in the summer. The falling-off in the catches was most noticeable in the Restigouche, Miramichi, St. John, and Margaree districts.

It is quite evident that the fisheries referred to, and also the trout fishery, should be afforded the best possible protection. The salmon, alewife and smelt for their commercial value, and the trout, and also the salmon, for their sporting value. While it is possible that the wonderful extent and variety of our rivers and lakes make unnecessary any unusual activities in restocking, yet it should be remembered that our waters are visited each year, to the advantage of the population generally and to the communities in particular, by many thousands of sport fishermen. Also, the power and other industrial developments have seriously affected a number of the best fishing rivers and streams. Further, the very variety and extent of our rivers and lakes prevent, to a large degree, adequate measures being taken to protect the fisheries from depletion by illegal fishing methods. Every effort should be made to preserve and increase the supplies, not alone for the benefit of the recreation-seeking population, but also in the interests of the shore fisheries, as it is evidenced from investigation and observation, that a decline in the river fisheries is followed by a decline in the shore fisheries. Therefore, added importance is given to the protection of the river fisheries, from a distinctly commercial point of view.

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## SHELLFISH.

The oyster fishery of the famous Buctouche, New Brunswick, and Bedeque, P.E.I., and adjacent districts, while showing an increase over the preceding year, is deserving of serious consideration, as the condition of the fishery is becoming more unfavourable each year. The dual administration in Prince Edward Island prohibits any efforts of general value, while the mud digging carried on extensively by the farmers in the vicinity of the oyster areas for the purpose of securing fertilizer, is destroying the grounds. Indeed, the encroachments upon the live beds by the diggers, some three hundred of which are operated in Prince Edward Island alone, is constant, and unless very decided action is taken to prevent or limit their operations, the oyster fishery will soon become extinct.

The scallop fishery is confined to Chester basin and Mahone bay district in Nova Scotia, and is an important industry employing some 500 boats during the season. There is evidence that over-fishing is having its ultimate result and action should be taken to curtail operations so as to prevent any dangerous disturbance of the balance of nature. From information at hand it would appear that scallop beds exist in other sections of Nova Scotia and also in districts in New Brunswick and Prince Edward Island. These districts should be examined to ascertain the extent of the areas and their commercial value, in order that the growing demand for this shellfish may be supplied, and the industry developed.

## EDUCATIONAL.

The growing agitation for technical education is a most encouraging sign, as there can be no doubt that the industry will not fully take its place in the fish trade of the world until those engaged in the industry are familiar with the best methods of catching, curing, packing, and manufacturing the product so as to take advantage of the demand of the domestic and export trade. It is also quite true that the rapid development of motor power for small boat and vessel propulsion is bringing about a very decided change in the operations of the fishermen. The motor-boat permits the taking advantage of prolific fishing grounds which hitherto have been too distant for successful exploitation by sail and row-boat fishermen.

Technical education has been under consideration by the department for some years, but it has not appeared practicable to deal with the question until definite provision had been made for a foundation to properly organize, equip, and maintain the necessary essential work. Generous provision has been made in chapter 73 of the Statutes of 1919, entitled the Technical Education Act, whereby the sum of \$11,000,000 has been provided to enable the Provincial Governments to initiate and organize technical schools suitable for the instruction of those engaging in these trades and callings. The Act provides an excellent opportunity for the technical education of the fishermen of these provinces, by arrangement between them individually and the Federal Department of Labour, and it would appear opportune for a beginning in this regard. I would propose:—

(1) *School of Navigation.*—The work of the School of Navigation now centered at the Halifax Technical College should be expanded by extension courses to be held at fishing centres throughout the division. There are a large number of uncertificated masters and mates of fishing vessels who should be enabled to perfect their knowledge and take the examinations necessary for the master's or mate's certificates. Also, with the development of the motor-boat there is wide need of a better knowledge of navigation in order that the fishermen operating considerable distances from the shore, be more generally equipped

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in this regard. At present, it is not possible nor practicable for the fishermen to attend courses at Halifax, and the proposal therefore to have well arranged short courses conducted at the various centres, at suitable seasons, would be of great advantage.

(2) *Motor Engine Mechanics*.—A knowledge of motor engine mechanics would be of great value. The introduction of the modern motor engine is having a wide influence on the industry. Too often, however, the operators of such engines, while ingenious and naturally quick to learn and apply "first aid," are under heavy loss caused by preventable breakdowns and repairs, besides using unnecessary supplies of gasoline. It is suggested, therefore, that courses conducted similarly to those referred to in connection with navigation, be prepared and held under competent men. This suggestion is apparently quite feasible.

(3) *Short Commercial Courses*.—While at present a considerable number of the fishermen prepare and market their own catches to advantage, a very considerable number are unfamiliar with the primary commercial processes, and therefore are not in a position to enter into the necessary negotiations for the marketing of their product. A short commercial course would be of value.

The three above-mentioned courses might be arranged as Technical College extension courses, and held in common, one with the other. I have consulted with Principal Sexton of the Technical College, who gave great encouragement to the proposals and expressed his willingness to co-operate in every possible way.

(4) *Fish Curing and Packing*.—Reference has already been made to the necessity of wider and more definite knowledge of the best and most remunerative methods for curing, packing and manufacturing the products of the sea. Careless and inferior methods prevent advantage being taken of the best markets and prices. While the "Meat and Canned Foods Act" and the "Fish Inspection Act" are wisely devised, it would appear that these alone, particularly as they are largely restrictive in their provisions, cannot possibly be effective in any large degree in influencing and educating the fishermen and dealers in the prime need of adopting the best methods in handling and preparing their products. Therefore it is necessary that competent instruction be given. It may be found difficult to adopt and carry on the necessary instructions in this regard until wider and more generous provision is made for the costs in connection therewith. It appears to me that the system of fishing bounties might well be changed, and the small bounties, large in the aggregate, given the fishermen could be used to better advantage in providing systematic instruction on the lines above suggested.

(5) *Fishery Officer Instruction*.—Under the reorganization of the Fishery Officer Service there is afforded a good opportunity of securing within a few years, a body of officials who are continually in close touch with all phases of the industry, and who may under proper training, become to a large degree, experts in connection with the fisheries of their respective districts. Under the reorganized service the positions of fishery officers become permanent, and their whole time is now required to be given to their duties and they are not permitted to engage in any other occupation. The arrangements that are being made to afford these officers systematic and well-defined courses of instruction, both technical and administrative, by gathering them together in convenient groups, at suitable places, from time to time, where lectures, demonstrations and experiments will be conducted respecting fish life and the various phases of the fishing industry, together with instruction in correct methods of administration of the fishery laws and regulations, and the numberless items that enter into this work should in a few years result in a staff of officers who will be able to efficiently serve the industry from the various standpoints.

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## OBSERVANCE OF THE REGULATIONS.

The observance of the regulations is gradually improving from year to year, although much remains to be done before the conditions are reasonably satisfactory. It is, of course, difficult to adequately supervise the operations carried on along the extensive coast comprised in this division, and to afford protection against illegal fishing practices, too often prevalent in the multitude of rivers, streams and lakes. The lobster fishery has first demand, so far as the sea coast is concerned, and requires constant vigilance to prevent illegalities. The fishermen and cannery operators are, however, becoming quite alive to the necessity of protecting the fishery, and are, in a large measure, affording every assistance to the officers in enforcing the law. The fisheries of the river and other inland waters, are exceedingly difficult to thoroughly supervise and protect, as practically every river and stream is frequented by species of fish of importance, either locally or commercially, and are often relied upon to furnish needed supplies to the residents of the various localities. The conditions in the matter of pollutions from saw-mills, etc., are improving, and obstruction to the ascent of fish to the spawning grounds are being removed, or otherwise remedied.

There is great need of correct and systematic surveys being made of the inland waters, in order that intelligent and effective measures may be taken to preserve the fisheries. Action will be taken in this regard as expeditiously as possible.

I would express my appreciation of the interest of the inspectors and officers of the division. While many of the new officers are as yet unfamiliar with their duties, the evident desire of the returned soldier appointments to make good in their new positions is encouraging. Appreciation is also expressed of the assistance rendered by many public spirited citizens in the interests of the inland fisheries, and particularly of the kindly support and encouragement that the Victoria Protective Association through their secretary, Mr. George Kennan, have extended to the officers who have supervision of the sport fishing waters of Cape Breton.

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REPORT OF INSPECTOR J. E. BERNIER, M.D., ON THE SEA  
FISHERIES OF QUEBEC, FOR THE YEAR 1919.

Notwithstanding that the fishing results of 1918 were barely average, the 1919 catch is even smaller, showing a decrease of over \$200,000 in value, despite the fact that the prices of all products of the fisheries have been steadily advancing. The decrease is due to various causes which affected the cod fishery in all sections of the district except at the Magdalen Islands; and to the complete failure in Saguenay county of the salmon fishery, which was also poor in the counties of Gaspé and Bonaventure. In Saguenay county some fishermen who used to catch from 400 to 500 salmon during the season, only succeeded in taking 40 or 50; and many did not think it worth while to leave their nets in the water during the whole time that fishing was permitted. The catch of all other kinds of fish was fairly good.

Owing to market conditions, the monetary returns have been sufficient to enable the fishermen to live until next season. The preceding years have been profitable, and the fishermen of the north coast and the Labrador consequently enjoy greater prosperity than formerly.

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As far as fishing methods are concerned the fisheries of the Gulf division still remain stationary, except for the growing use of motor-boats. In spite of all the campaigns of the last few years to popularize the fishing industry, it is noticed that young men especially seem inclined to go away to the cities, or to take up any other occupation than fishing. Although the population is increasing in certain important localities, there is a decrease in the number of fishermen and fishing boats, which is becoming alarming.

The principal fisheries of my district are those for cod, lobsters, herring, salmon and mackerel. Of these cod is the most important, exceeding in value all other kinds of fish together.

## COD.

In the county of Saguenay cod appeared near Natashquan at the end of May, where they were found in very large quantities during the first weeks of June. From there, they went westward along the north coast, and reached the neighbourhood of Saguenay river, where they had not been seen for many years. Extraordinary as it may seem, they went up as far as the estuaries of certain rivers, and at Moisie many hundredweights were caught in the nets which had been set for salmon.

Their presence, in almost unlimited quantities at the beginning of the season, promised large catches, and fishermen were prosecuting the fishery in a most active manner when large schools of porpoises appeared on the whole of that coast. During June, July and August, these kept moving continually eastward and westward near the shore between the entrance of the St. Lawrence, and Natashquan. Fishery Officer N. A. Comeau, of Godbout, thinks that these schools are composed of from 15,000 to 18,000 porpoises, and from information received through telegraph offices, he observed that they were moving at the rate of 80 miles per day.

During the two or three days following each appearance (which took place three or four times monthly) cod rapidly disappeared, and it was impossible to catch any even in small quantities.

The oldest fishermen noticed, from time to time, some isolated porpoises in the gulf, but never saw nor heard of such large quantities appearing together. In supposing that each of these 15,000 or 18,000 porpoises consumed one hundred pounds of fish per day, we will have an idea of the enormous quantities that can be destroyed during a whole year, or even during a season.

About twenty years ago some naturalists, among whom was Mr. A. M. Montpetit, called the attention of the public to the enormous destruction of food fish by these porpoises; and they foresaw that, owing to their increasing number from year to year, there would come a time when they could not find food in the river, and would invade the gulf and there cause considerable damage to fisheries.

This anticipation was realized during the last season with the above consequences, which would have been disastrous if cod had not remained in such large quantities.

If it is admitted that these porpoises went into the gulf because they could not find in the river as much food as they needed, it is difficult to believe that the waters they have ruined gradually for many years will have time to restock themselves enough to permit those porpoises to live there permanently in future.

In Labrador, cod fishing was made impossible until the end of July, owing to the presence of ice which disappeared only late in spring, to be replaced almost immediately by other ice coming from the strait of Belle Isle. On the 8th July, following a strong eastern wind, a large field of ice was dispersed on an area of

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about 100 miles, and obstructed the coast from Blanc-Sablons to St. Augustin. During the last week of the month, after ice had been removed by a strong wind, cod showed itself in large quantities up to the 15th August, and big catches made up for the failure of the beginning of the season.

In the counties of Gaspé and Bonaventure, and more particularly on the coast of Baie des Chaleurs, cod was scarce until fall, and no reason was found for the same.

#### LOBSTER.

In Magdalen Islands, the catch for 1919 shows a falling-off, due to the fact that fishing was conducted with less activity than in the past year, more than to the decrease of lobsters, which have always been of a good size and which remained in quite large quantities. The rather small prices paid to fishermen induced the latter to quit before the end of the season on the 20th July, and to give their time to cod and mackerel fishing which were more profitable.

In the counties of Gaspé and Bonaventure, the results were practically the same as those of last year.

The lobster canning has been discontinued in Anticosti island. In Labrador, many owners of lobster factories obtain licenses without, however, keeping their factories in operation, so much so that in the county of Saguenay the pack was only one-fourth of that of 1918.

It is true that in these far localities, where the necessary material for lobster fishing is expensive and often hard to obtain, the benefits derived are very small. Owing to the present market conditions, fishermen get better results in cod fishing.

It is observed that the public interest is increasing regarding the protection of this fish. During the season there were ten prosecutions for illegal fishing in Magdalen Islands, and one in the county of Bonaventure.

#### HERRING.

Herring appeared on the 21st April in the Baie Plaisante and remained in normal quantity all around the islands during the month of May and the first days of June. The total catches there although less considerable than those of last year, were more than sufficient for the needs of smokehouses, as well as for the needs of cod and lobster fishing. As usual, they caught more than could be used. Foreign fishing boats, which come to the islands after bait, are becoming less and less numerous so that fresh herring is in less demand. The smoking industry, which started during the war, is being more and more expanded. From the number of new establishments which are built every year, one must conclude that those who are devoting themselves to the preparation of smoked herring are making large profits. In the counties of Bonaventure, Gaspé and Rimouski, herring is still used as fertilizer only, and as bait for lobster and cod fishing. In the county of Saguenay, it is rather scarce.

#### SALMON.

The production of salmon fisheries, which have been decreasing gradually for the last three years, is still falling off. Compared to that of the preceding season, the results of which were already bad, it shows a large decrease. This is due to the fact that in many localities the migration took place during the last days of July when the greater part of fishermen had stopped fishing. This late migration, which continued in August, was clearly demonstrated in Labrador where, at the beginning of the same month, a large number of salmon were caught in nets set for cod. I was informed by hunters, who visited certain rivers during the fall, that the spawning beds were full of parent salmon.

ANGLING WAS NOT A GREAT SUCCESS, EITHER.

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The unsatisfactory results are also partly due to the absence of caplan in all the northern part of the gulf, and the presence of ice until July in Labrador.

Some rivers on the south shore of the St. Lawrence should be better protected than they are. From reports received, poaching is still going on in the rivers Cap Chat, Ste. Anne des Monts and Mont. Louis. I could not, however, obtain direct information to enable me to prosecute the poachers.

## MACKEREL.

Mackerel, which is caught in the gulf division, comes from Magdalen Islands; the counties of Gaspé and Bonaventure only supply small quantities. This fishing has been practically nil in the county of Saguenay for many years. No interest is taken and they do not even have necessary equipment. However, there are good indications that mackerel will reappear on this coast as well as in Chaleurs bay, where it was formerly found in such large quantities.

The production of the current year is inferior to that of 1918 which gave a result smaller than that of the last four years. This failure can be explained by the fact that serious damages were sustained by a large number of mackerel nets through a storm; the fishing, which was only beginning and showing good results, had to be abandoned.

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It must be acknowledged that the last season was very quiet in all the stations of the district. There was no disorder worth mentioning, except a few violations of the law already mentioned in Magdalen Islands and in the county of Bonaventure. I wish to state again that in this last locality there is practically no officer for the protection of lobsters. I was informed during the winter that there was some live lobster trade going on after the 26th June. Mr. G. T. Annett has been looking after this section for the last two years, but as he is living at Gaspé, i.e., 200 miles east of the county of Bonaventure, he cannot reasonably be aware of what is going on. I am of the opinion that a permanent fishery officer should be appointed for Bonaventure.

The number of licenses issued in 1919 was smaller than in 1918. The difference is due to the fact that many Newfoundlanders who, as usual went to Labrador for codfishing, were prevented from doing so by the ice which remained near the coast up to the end of July.

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REPORT OF CHIEF INSPECTOR G. S. DAVIDSON, PRAIRIE  
FISHERIES DIVISION, FOR THE YEAR 1919.

## PROVINCE OF ALBERTA.

The district of northern Alberta shows a large increase in the catch of all kinds of fish, though the number of commercial and fishermen's licenses is not so large as in the year 1918. This increase may be attributed to the fact that the northern country is being rapidly settled, which means a larger demand for fish, the roads throughout the district improving greatly, enabling the fishermen to tap new lakes and to get their catch out of shipping points in good condition, increase in the number of dealers and improvement in their plants for the handling of the catch which allows of their handling more fish than formerly.

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In the district of southern Alberta, angling, which is the chief fishing, has fallen off greatly. The past summer was one of great drought in this district; many of the streams which in previous years carried sufficient water to make good trout streams, dried up, or became mere trickles of water. Many fish were lost in this way. A number of streams were closed by the department to all fishing for a period of two years. This I am sure will have a beneficial effect and lead to the natural restocking of those waters. Action has been taken to compel the screening of all irrigation ditches. This will, undoubtedly, save immense quantities of sporting fish. The commercial fisheries of this district are of very little importance, the Red Deer river being fished for coarse fish under fishermen's licenses, only seven licenses having been issued, the catch being one thousand pounds each of pickerel and suckers, all of which is used locally. During the year there were ten prosecutions for violations of the regulations, as follows:—

Fishing in Close Season.....	3
Fishing without license.....	1
Possession of undersized trout.....	3
Dynamiting streams.....	3

One case of obtaining license by false representation was noted. In this case the license was cancelled at once. The fishways are in good order. Reports made in connection with obstruction of streams by beaver-dams were investigated and it was found that in practically every case the obstructions were situated within forest reserves. The Southern Alberta Fishermen's Association was formed in Calgary, with which will be affiliated like associations in the southern district. The members of this association have given their assurance that they will co-operate with the department in every way to further the protection of the sporting fish. They have already made several valuable suggestions along this line which have been placed before the department.

#### PROVINCE OF SASKATCHEWAN.

In the northern portion of the province, there was a decrease in the quantity and value of fish taken, due to fewer fishermen operating in many districts, though in some districts there were more fishermen than in the preceding year, and in such districts, increased catches were obtained. Not only are no lakes showing signs of depletion, but the fish are improving in quality and size.

Developments in the fishing industry during the year include the erection of a large warehouse at Big river and a saw-mill at Dore lake, for the manufacture of fish boxes, building of new piers and wharves, and improvements in the roads leading to the lakes. Many fish camps have also been built to replace those destroyed last year by forest fires. The demand for frozen fish is growing and prices are firm. Local markets are well supplied and the surplus shipped to United States markets.

The district was well patrolled by an efficient staff of officers, and the close seasons have been well observed. There are officers residing at most points where saw-mills are operating, and no pollution of streams took place. All fishways are in good condition, and allow the free passage of fish at all seasons of the year.

In the district of southern Saskatchewan, the catch of whitefish in Lowes lake district is smaller than in the year 1918. This is accounted for by the overseer in charge, as owing to the strike in Winnipeg last summer, which stopped all shipments of fish, that being the chief market for the catch. Fish are as plentiful as in former years and there are no signs of depletion. It is reported that the whitefish have not spawned by the opening of the winter fishing season, December 15, the fish not having completed spawning until January 1. The same condition is observed in the Qu'Appelle lakes, and it would appear that a change in the date of the opening of the winter fishing season in these two districts would be beneficial.

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The Qu'Appelle lakes and lake Katepwe have this season been administered under an overseer as one district; which has worked out to advantage. The stocking of these waters with whitefish from the Qu'Appelle hatchery is this year showing results, some fine whitefish having been taken. Owing to the whitefish coming to maturity this year a change in the mesh of nets used for fishing was made from  $4\frac{1}{2}$  inches as used in previous years to  $5\frac{1}{2}$  inches; this has resulted in a smaller catch of coarse fish and tullibee, and was not popular with the fishermen; but in my opinion was the proper course and should be continued. The catch is not so large as in the previous year but this may be put down to the use of the larger mesh. One hundred fishermen are shown as operating. Of these, sixty-six fished from January 1, 1919, to the end of the fishing season, and thirty-four from December 15 to December 31, 1919, so that during the latter period there were only about half as many fishing as there were last year, between the same dates. This would account for a smaller catch, the best catches being taken during the first two weeks of the season. A number of fishermen who last year fished the Qu'Appelle lakes are now fishing in Lowes lake, where they can take advantage of the summer fishing. This would account for the falling-off in the number of fishermen operating on the Qu'Appelle lakes at the present time. There are very few experienced fishermen on these lakes, a fact which tends to reduce the catch. There were four prosecutions in the southern district: three for fishing within twenty-five yards of the mouth of a fishway, one for selling fish taken under domestic license. An increase of four icehouses is noted at Lowes lake, also an increase in the number of row-boats and gasoline boats at the same lake, the fishermen adding to their gear, from year to year.

During the year 1919, I visited practically all the northern lakes and was gratified to find the great improvements in the methods of handling the catch. Every effort was being made to put the fish on the market in perfect condition. The sanitation of the plants was good, everything being kept clean and in good condition. Great attention was being paid to the proper cleaning of the fish, and all utensils were kept perfectly clean. I also met all the fish-dealers and had many discussions with them in connection with the different phases of the fish industry. I found them in nearly every case, ready and willing to do what was necessary towards the improvement of the industry and the preservation of fish. I am pleased to say that there was no waste of fish at all, though this particular point was under the closest scrutiny by officers on the ground.

## PROVINCE OF MANITOBA.

During the year just ended, the fishery service in Manitoba suffered the loss of three of its officers: Inspector J. A. Howell, whose death occurred on June 3; Guardian D. S. Daly, who died on the 13th of May; and Special Guardian William Overton, who died on the 5th of September.

Fishing throughout the province was, on the whole, as good as the previous year. Owing to low water in the Saskatchewan river and tributary waters, summer fishing in the northern district was practically a failure.

In District No. 1, lake Winnipeg, 783 licenses were issued.

In District No. 2, which includes the whole of the province with the exception of lake Winnipeg, 1,341 licenses were issued.

Only one prosecution took place in District No. 1, while in District No. 2 there were eight.

There has been in the past a tendency on the part of the fishermen, and fish companies, to use a smaller mesh net than that prescribed by law, but under the new reorganization it is hoped to put an end to this corrupt practice.

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Much assistance was rendered by the members of the Royal Northwest Mounted Police, also by the provincial police of the provinces of Alberta and Saskatchewan, especially in those districts where conditions make it possible for guardians to visit only occasionally.

Taken on the whole the regulations were well observed when the area of the districts administered is considered.

The officers under my supervision, with very few exceptions, performed their duties in a satisfactory manner.

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REPORT OF CHIEF INSPECTOR, LIEUT. COL. F. H. CUNNINGHAM,  
WESTERN FISHERIES DIVISION (BRITISH COLUMBIA) FOR  
THE YEAR, 1919.

Assistant Chief Inspector, J. A. Motherwell, Vancouver, B.C.; District No. 1—A. P. Halladay, New Westminster, B.C.; District No. 2—J. T. C. Williams, Prince Rupert, B.C.; District No. 3—E. G. Taylor, Nanaimo, B.C.

There was practically no change in the administrative and commercial aspect of the fisheries as compared with the previous year.

In District No. 3, three new canneries were in operation, one located at Sooke harbour and two on Barclay sound, one of these being erected for the purpose of canning herring, and subsequently the operations were extended to the canning of salmon.

The only administrative change was in the experimental direction of extending the areas over which purse seine licenses could operate, Knight inlet being the most important used in this direction. The result was satisfactory except that the licensees congregated at the most valuable fishing grounds, and it is quite possible that the fishing would have been too intensive at these places had it not been for the watchfulness of the fishery officers, who strictly enforced the regulations regarding fishing boundaries. To obviate this in future the fishing boundaries must be extended further from the mouths of the rivers, not with the intention of handicapping the operations but in pure fairness to both fish and fishermen.

The total pack of all varieties of salmon was 1,392,966 cases, as compared with 1,616,157 cases for the previous year. The decrease is largely due to the limitation in the packing of chum salmon, the decreased run of pink salmon owing to the disastrous freshets of 1917 which affected the spawning areas, and also to the necessity for the earlier annual close season on account of the unprecedented dry season. This early cessation of fishing affected the coho pack as the pink salmon had gathered around the mouths of the streams and were joined by the cohoes. If fishing operations had been allowed to continue it would have proved disastrous to both these species as in taking the cohoes, pinks would have been caught which had so deteriorated as to render them of no commercial value. This possibly was a hardship on both fishermen and cannerymen but it certainly was in the interests of conservation and will no doubt be realized in the run of 1921.

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*Returned Soldier Citizens.*—Owing to the necessity for the re-establishment of returned soldiers in the various avocations of life it was necessary to change the fisheries policy in the northern part of the province to meet these conditions. Consequently the number of salmon gill-net licenses issued was increased, thus enabling all returned soldiers desirous of doing so to take part in the actual fishing. The statement at the end of this report gives the number of returned soldiers who took advantage of this opportunity. Whilst many of these returned men were inexperienced in fishing they received assistance and advice with the result that on the whole they were successful, not perhaps to the extent they anticipated but the exaggerated benefits they were led to believe would accrue from the fishing planted the foundation for greater expectations than were warranted. Whilst these expectations were not fulfilled the general results were satisfactory to them.

## DISTRICT NO. 1, (FRASER RIVER.)

The total pack of the Fraser river watershed amounted to 158,628 cases, as against 206,003 cases for 1918. The pack of sockeye was 29,628 cases, which was small even for an off year. It is encouraging, however, to note that this variety was in excess of 1918 by 12,779 cases. The quantity of salmon exported other than sockeye was greatly in excess of the previous year.

There was a very heavy run of sockeye during the month of October after the close season for the use of  $5\frac{3}{4}$  inch mesh nets. These sockeye entered the streams tributary to Pitt lake, including the Lillooet river, Gilley creek, Silver creek and the Upper Pitt river, and large numbers found their way to the Coquihalla river and Kawkawa lake, which is tributary to the Coquihalla. There was also a large run to Cultus and Chilliwack lakes. These fish reached the spawning grounds in good condition and good results should follow in 1923. Whilst this run was late in 1919 there is nothing to prove it will always be a late run and may come as an early run in the year they return to their spawning beds.

From an inspection of the spawning grounds in the lower Fraser river watershed it is evident that the number of cases packed cannot be used as a basis for estimation as to the number of the different varieties that actually reached the natural spawning grounds. It is also pleasing to note that there is an encouraging improvement in the run to the Shuswap lake areas.

The regulations were fairly well complied with and the enforcement of clause 80 of the Fisheries Act, whilst perhaps a drastic measure, has had a salutary effect in minimizing the number of violations as compared with the number of licenses issued. There were eight gasoline launches used in patrolling the district, five being owned by the department and three under charter.

The services rendered by the fishery officers were of an energetic nature, impartial and satisfactory.

## DISTRICT NO. 2.

*Skeena River.*—The abnormal run of sockeye to this river fully demonstrates what has been stated in previous reports that little is known of the natural life-history of the salmon. Notwithstanding the evidence obtained by the Fisheries Commission of 1917, which was on the lines of a depletion of this variety, yet the run to this river was the greatest since 1913, and resulted in a pack of 184,945 cases of this very valuable variety.

The run of spring salmon in the river was not as good as in 1918 but it must be remembered that there is a considerable drain on this run before it reaches the river owing to the intensive operations of the trollers outside, which naturally decreased the run to the river itself.

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The run of pink salmon was not good but the run of 1918 was the heaviest experienced for many years and there is no doubt but that the unprecedented freshets of 1917 were responsible for this as they must have affected most seriously the spawning beds.

The operations of returned soldiers on the Skeena river were of necessity limited as it is a hazardous area to operate in owing to the tides and the rougher elements in Chatham sound, but experience at other places will be of great assistance to those soldier citizens desiring to operate this year on this river.

*Naas River.*—It is regrettable to have to report that the salmon fishery of this river needs special attention if the run is to be continued. I have already drawn the attention of the department to the operations of American traps outside Pearce canal, north along the Alaska coast to cape Fox. These traps were most successful in capturing salmon heading for the Naas river and unless some international arrangement is agreed upon whereby these salmon will receive proper protection whilst passing through international waters this river as a producer of salmon and as a commercial asset is in the opinion of the officers of the department doomed.

Portland canal, which used to carry great quantities of salmon previous to the operation of these traps, shows a great depletion, as also does Observatory inlet and Alice arm, and further, the reports of the special provincial and Dominion officers show practically no spawning fish on the grounds in Meziaden lake. It is certainly in the interests of both the American and Canadian industry that immediate action be taken to ameliorate this condition of affairs.

*Rivers Inlet.*—The total pack amounted to 80,367 cases, of which 56,258 cases were sockeye. The pack would indicate that the run of this species was poor but the actual fact is that the run was heavier than it has been for years. The reason given for this is that the fish were small and passed through the  $5\frac{3}{4}$  inch mesh nets. Another reason advanced is that the fish swimming deep passed under the nets, and I am of the opinion that the latter is nearer the solution than the previous one. The spawning beds of Owekano lake carried more sockeye than for years past. In addition to the hatchery being filled to capacity the natural spawning beds were exceedingly well seeded.

*Smiths Inlet.*—The run of all varieties of salmon to this area shows an improvement and the reports of special officers inspecting the spawning beds indicate that they were well seeded.

Reference is made to the unfortunate action of gill-net fishermen in destroying the seines operated under license in Quashela creek. The license for this area has been in force ever since the cannery was erected, some twenty-five years ago, and whilst during the past four or five years it has been a bone of contention it must be remembered that it is only of comparatively recent date that sockeye have been caught by gill-nets in this inlet in paying quantities. The department had given sympathetic consideration to the contention of both the licensees and the fishermen, and the decision reached was that the licensees should be allowed to operate the seine for a limited number of days during the season of 1919, after which season the license would not be renewed. The gill-net fishermen, however, took matters into their own hands and destroyed the seines.

There is no doubt that the discontinuance of the license for this creek will be the means of building up the run of sockeye salmon in this area to its former condition, as owing to the phosphorescent nature of the water in the inlet it is not possible for any number of gill-nets to seriously affect the run of fish, hence it may be reasonably expected that Smiths inlet will resume its place as one of the most important areas for sockeye salmon.

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*Central Division.*—This division includes Namu, Bella Bella and Gardner canal. The run of all varieties of salmon was fairly good, especially the run of what is known as "Creek" sockeye to the waters of the Bella Bella area. In this area the fall fish predominate and the operators must to a large extent depend upon these grades for their pack.

*Bella Coola.*—The run of all species of salmon was not good. The run of pink salmon was no doubt largely affected by the freshets of 1917, which were generally disastrous in this portion of the province. A number of returned soldier citizens have made their homes in Bella Coola on the land and depended upon the season's fishing to help them out. Consequently whilst it cannot be said they are discouraged still the results of their operations were not commensurate with their indefatigable efforts.

*Queen Charlotte Islands.*—On the east coast of these islands alternate runs of pinks and chums are usual; 1919 was the season for the latter variety and great quantities were caught and shipped in a green state to the Skeena river and south. The Moresby island fisheries also salted a large quantity. Returned soldier citizens hold the majority of the seining licenses in this area and on the whole their operations were successful.

*Trolling.*—The trolling industry is becoming more popular with the fishermen and there was a greater number of licenses issued than during the previous season, but the results were not so successful as in 1918 as spring salmon and cohoes were not so plentiful. This mode of fishing is receiving considerable attention from an economic standpoint. It is stated that quantities are hooked and lost and consequently die. It is also reported that spring salmon with large hooks imbedded in their mouths have been caught in gill-nets on the Skeena river. The American authorities are also considering the results of this style of fishing from a conservation standpoint. It is not fair to the fishermen that any value should be placed on rumours and it would be in the interests of all concerned if a reliable officer, who should if possible have scientific attainments, were placed for one season on the trolling grounds to report on conditions.

*Halibut.*—Prince Rupert is yearly growing in importance owing to this fishery. The fishermen operating out of this port had another successful year, the quantity, quality and price being maintained. Statistics will show that the catches were heavier than in 1918. The American catches and deliveries were far in excess of those from Canadian sources. Between five and six hundred carloads of Canadian and American halibut were shipped over the Grand Trunk Pacific railroad during the year, and it is stated that Prince Rupert will in a few years be the most important depot for halibut on the Pacific coast.

The international arrangement covering a close season for halibut should by the protection afforded materially assist in keeping up the supply of this species and enable Prince Rupert to take a foremost place as a distributing point of the halibut fishery.

*Herring.*—There is not much to be said on the herring fishery of this district as they are taken mainly for bait purposes. The Japanese make a success of this fishery by dry-salting and shipping to the Orient, whilst the white fishermen, owing to conditions, are not able to compete successfully. Halibut fishermen have in the past complained bitterly as to the lack of bait but this has been partially overcome by the establishment of herring pounds in the vicinity of Prince Rupert. During 1919 one or two were operated successfully and the number will be increased for 1920.

*Protection.*—During the season of 1919 conditions were such that it was possible to give a greater protection to the fisheries of this district. The steamer *Thomas Crosby* was again chartered. The department owns seven fair-sized gasoline boats and there were also twelve other boats under charter manned by officers who gave satisfactory service.

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## DISTRICT NO. 13.

This district includes no sockeye areas of any great importance. The principal ones are a small run to Anderson lake through the waters of Barclay sound, to Kennedy lake through Clayoquot sound, also to Sauch-en-auch creek and Knight inlet, the most extensive sockeye river being the Nimpkish opposite Alert bay. The operators must therefore rely very largely on the fall fish for their packs. The run of sockeye to the Nimpkish river showed a great improvement over 1918 and conditions there are generally satisfactory.

The run of pink salmon over the whole district was small and whilst this was the off year for this variety in many places in the district the run was even smaller than expected, attributable no doubt to the 1917 freshets already referred to.

Reference must be made to the fishing conditions on the west coast of Vancouver island covering the area from cape Beale to Sombrio point. There were twenty-nine purse-seine licenses operating in this area of which fifteen were issued to returned soldier citizens. These men were not in a financial position to supply themselves with boats and nets consequently they had to make the best arrangements possible with those owning the necessary gear to operate their licenses. Whilst it is possible the best arrangements were made by them under the circumstances, still the conditions were not satisfactory and led to such intensive fishing that practically no salmon (chums) reached their spawning beds. This is a serious state of affairs as it means the cycle has been broken and the corresponding run of the 1919 fry will be practically nil. The aggregate catch was a fairly large one, but from an economic standpoint were of no value to Canada as the bulk of them were shipped in a green state to be canned in the United States.

To Barclay sound there was a tremendous run of dog salmon and from this quarter large quantities were also exported.

The run of sockeye to Anderson lake was fair and the run to the Somass river shows a decided improvement as during the past few years these fish have not been molested to any great extent. The cannery owned by the western packers and located at Shushartie was not operated this season, it being the object of the owners to allow all of the pink salmon to reach the spawning beds, and thus, if possible, build up a good annual run improving present conditions of a good run only every other year.

There was an increase in the number of purse-seines operated, all by returned soldiers, and whilst the returns may not have reached expectations they were in the majority of cases satisfactory.

There is nothing of special interest to report in connection with this district except in connection with trolling. This mode of fishing is on the increase and many complaints are received that in the early part of the season very small fish of the spring and blueback variety are to be found on the market. It is practically impossible to enforce any suggested regulation covering this unless all trolling is prohibited until later in the season. If this action is taken it prevents the capture of the early run of spring salmon which are most valuable as a commercial commodity. It has been suggested that only a certain sized hook should be used for the earlier months of the season which would prevent the capture of small fish, but such a regulation could not be enforced as it would mean placing an officer on every trolling boat to prove of any value. The suggestion already made of an officer with scientific attainments to investigate this mode of fishing would be most valuable.

*Herring.*—There has been a very large run of herring all over the district and some 30,000 cases have been canned in Barclay sound. Owing to market conditions the output of "Scotch cured" herring has been greatly limited as it is impossible to compete commercially with the product of the British Isles, and until transportation rates and labour conditions again become normal the

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outlook for this business is not good. There has, however, been a great impetus this season in the business of dry-salting, the increase being 138,870 cwts., which finds its way to the Orient. This business should be fostered and to keep up the quality all shipments should be inspected before leaving the country. It is also to be recorded that there is an increase in direct shipments by British subjects, which is satisfactory to the trade.

*Reduction Works.*—There appears to be a satisfactory increase in the manufacture of by-products, and whilst several oileries were established during the war and the product of oil received a ready sale this condition maintains in peace times even to a greater extent as the operations have generally improved and the whole dogfish is now being utilized for oil and for the manufacture of cattle and chicken food. Each establishment erected is an improvement on the last and there is no doubt but that these factories will be extended to cover the production of other products, such as the conversion of sharks, hair seals, sea lions and porpoises for commercial purposes.

As in other districts it was possible to increase and extend the protection service and it is pleasing to note that the infractions of the regulations are limited.

## REMOVAL OF OBSTRUCTIONS.

Approximately \$30,000 was expended in connection with this important work. Over \$6,000 was spent in cleaning out streams tributary to Owekano lake, and which from reports of inspection subsequently made have been of great value in enabling the parent fish to reach their natural spawning grounds. Other important work was performed on Black creek, Rosewall creek, Cooks creek, Big Qualicum river, Nahwitti river, Okis Hollow creek, Coquihalla river and the Yakoun river, on Queen Charlotte Islands. Obstructions were also removed from smaller creeks. All of the places mentioned are now practically clear to the free access of salmon.

Work of this nature has its difficulties owing to the isolated locations and the necessity for transportation of men, material and provisions by special boats. A great deal of this work was necessary owing to the carelessness of loggers in not removing debris from the creeks when their work was completed and which formed the nucleus of obstructions, time and nature doing the rest. There is hardly a creek up which salmon go to spawn but which requires attention caused either by natural or logging operations. It is considered that a continuation of this class of work would be of immense value to the fishing industry.

Engineer McHugh has been indefatigable in his efforts to personally supervise this work as much as possible, but owing to the absolute necessity for his personal supervision of most of the work in connection with the construction of the Lakelse hatchery he was not able to give so much of his personal time to the removal of obstructions as could be wished. He has been given the assistance of a most efficient assistant who was able to give a good deal of the work personal supervision.

The general impression of those interested in the industry and in the perpetuation of the salmon as a continued commercial asset is that this work should be proceeded with as expeditiously as possible. This is being done, but it must be remembered that the amount of work to be accomplished is limited by natural conditions but the department and its officers realize the value of a clear waterway to the parent fish in reaching their spawning grounds and no opportunity will be lost in pushing the work as rapidly as the appropriation and other conditions will permit.

The fishery overseers have been instructed to keep a close supervision over the streams at the time the salmon are running in order to determine more definitely the seriousness of alleged obstructions, and they will also on streams which have been cleared see that the nucleus of any new obstructions is immediately removed. The labour used in this work was composed of practically all returned soldiers.

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## FISH CULTURE.

This is a very interesting topic at the present time when the value of this work is being criticised in some quarters. It appears to the undersigned that if these critics devoted the same energy in the direction of conservation that they do in condemning the actions of the department the fish hatcheries would become even of greater value than they are as they would be able to turn out a greater number of fry owing to the fact that there would be more parent fish on the spawning beds which Nature would take care of and the hatcheries would take care of the surplus eggs.

During the past season of 1919 there were five hatcheries operating on the Fraser river watershed, two on Skeena river, one on Rivers inlet, three on Vancouver island and one at Gerrard. Nine of these are devoted exclusively to the incubation of salmon eggs, the Cowichan lake hatchery partially so, while the Gerrard hatchery is a trout hatchery. The total distribution of sockeye fry during the spring of 1919 in the

Fraser river watershed was.....	34,100,000
Skeena river watershed.....	8,000,000
Rivers inlet.....	3,000,000
and on Vancouver island.....	4,608,550

In addition to this there was the usual number of spring, coho, hump-back and chum salmon fry distributed.

Good progress is being made in the construction of artificial rearing ponds in connection with the various hatcheries where the geographical situation will permit of this being done. Another improvement is the distribution of fry as much as possible on the natural spawning beds. At the Cowichan Lake hatchery the value of such rearing ponds has been demonstrated, thousands of spring salmon having been released after attaining a size of over two inches in length. There is no question but better results are assured by the liberation of fish having reached this size as they are stronger and in a better condition for self-preservation than the fry where the sac has only just been absorbed.

The officer in charge of the Harrison Lake hatchery has for the past two or three seasons been experimenting in the hatching of fish eggs by the gravel method. This system is not generally understood by the public but for information generally the procedure consists of placing fairly large stones in the bottom of a prepared box or can. A certain quantity of eggs are then placed in the receptacle, the eggs finding their way into the crevices between the stones. Smaller stones are then added, more eggs are placed in the receptacle filling up the newly-formed crevices and this is continued until as many eggs have been deposited as is considered desirable. A supply of water is arranged for by a space left in the box for this purpose and it finds its way through the larger stones at the bottom of the box, working up through the gravel and escaping at the top, thus keeping the eggs constantly damp. Eggs incubated by this means do not appear to fungus and when the fry are hatched out, the sac absorbed, the young fish then feed on the infertile eggs which may remain in the gravel. It is claimed that fry hatched out by this means retain to a greater extent wilder habits than those which are hatched in the open troughs in the hatcheries it being further claimed that hatchery fry become accustomed to their surroundings and lose a certain amount of that wild instinct which the gravel-hatched fry retain. It is very questionable if there is such a great difference in this respect as between the fry hatched out by the different systems—self-preservation is the first instinct of nature and unless the fry are kept sufficiently long to accustom them to artificial feeding it is difficult to conceive that the natural wild instinct should be lost in such a short time. However, fish culture, like everything else, is open to improvement and the system of gravel hatching will be extended and if it proves a more successful means of increasing the supply of fish than the present method it will certainly be adopted.

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I would like to refer here to the work of Mr. Alexander Robertson, officer in charge of the Harrison lake hatchery, who has been untiring in his efforts whilst an officer of the department to in all cases improve the present system of fish incubation, and he is deserving of great credit for the success he has met with. He has proved even with present experiments that the gravel system is a successful one and this system can be used to great advantage in stocking streams where the supply of parent fish is being depleted and where it is practically impossible to build a hatchery, or in isolated places to which the fry cannot be transported. The eggs can be taken there and incubation completed by the gravel system.

It is unfortunate that the hatchery operations should be the subject of the present criticism, especially by opponents who it is doubtful have ever been in close touch with the operations of a fish hatchery and who know little if anything of the procedure. They air their views in the press and because they may be interested in the canning business their views are accepted by the general public for this reason only, and the experience of men who have given their lives to the work of fish culture both in this and other countries has no value.

In a recent report to the New Westminster Board of Trade it was stated that the Harrison lake hatchery was blamed by many experienced fishermen for the depletion of this run, but the facts are that the only portions of the Fraser river watershed carrying a supply of parent salmon this year are where hatcheries are located. The run of sockeye to Morris creek, a tributary of the Harrison river, is increasing every year. The run of Sockeye to the Birkenhead river, a tributary of the Lillooet river was phenomenal. Why? Because of the output of fry from the Pemberton hatchery in 1915. The Coquihalla was not a sockeye river until fry were placed there from one of the hatcheries, the result being that this year shows an estimate of 75,000 parent fish on the spawning grounds.

Some resolutions state that the hatcheries are a failure and yet the same resolutions blame the hatcheries for the run of small fish. There are small fish and large fish as the results of nature, so if the hatcheries are responsible for small fish they must also be given credit for large fish as well as it does not seem possible that only small fish would be the result of hatchery operations.

When one considers that the sockeye heading for the Fraser river are preyed upon by the traps in Juan de Fuca strait, the seines and traps in international waters miles of gill-nets for fifty miles of the Fraser river to Mission bridge, above Mission bridge by Indians and settlers, it is a miracle that there are as many fish coming to the Fraser river watershed as there are to-day, and it will be conceded by impartial judgment that the hatcheries are responsible to a large extent for the present although somewhat limited supply.

It is quite possible the system may be improved upon and every effort is being made to assist nature, but nature must also be assisted by those interested in the commercial life of the industry by allowing a sufficient quantity of parent salmon to reach the spawning grounds for the purpose of reproduction.

The resultant fry obtaining from the shipment of Alaska sockeye eggs transferred to the Harrison lake hatchery turned out very satisfactory. Fifteen millions of this variety were distributed in the various creeks emptying into Harrison lake. The fry were released as far up the creeks as it was possible to travel, thus placing them on or near the natural spawning grounds. Approximately a million and a half of the fry were held in the hatchery retaining ponds and troughs and attained a good size before passing into the lake. The fry when distributed were strong and hardy, and the shipment of eggs, the incubation and the liberation of the fry was a decided success.

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## REVENUE.

For several seasons past consideration has been given to the desirability of providing for an increased revenue more commensurate with the commercial value of the fisheries of this province. For the season of 1919, the license fees were increased as follows:—

Salmon cannery	licenses from	\$50. to \$500.
" purse-seine	"	\$75. to \$300.
" drag-seine	"	\$50. to \$150.
" trap-net	"	\$75. to \$500.
" gill-net	"	\$ 5. to \$ 10.

In addition to the above one-half cent per fish was collected on all salmon caught by purse- or drag-seines. A fee per case of canned salmon containing forty-eight pounds was also levied at 4 cents a case for sockeye and 3 cents per case for all other varieties. These fees, together with the amounts received for fines and the sale of confiscated articles, reached a total of \$253,997.60.

For the purpose of revenue collection the province was divided into two areas,—

- (1) The Fraser river, Howe sound, Vancouver island and the mainland adjacent thereto;
- (2) All waters north of cape Caution extending to the boundary line in Portland canal.

Owing to the vast area over which fishing operations are conducted the collectors had a great deal of travelling and detailed work to arrange for, but I am pleased to say they performed their duties in an efficient manner and for a first season the enforcement of the new revenue regulations was most satisfactory.

## GENERAL REMARKS.

The desire of the returned soldier citizen to participate to a greater extent in the commercial industry created a difficulty in connection with the increase of the number of purse-seine licenses. It was felt that in the interests of conservation there were already sufficient, intensive fishing operations being conducted that the run of the various species of salmon could maintain, but it was also felt that the conditions warranted a greater encroachment on nature's supply, hence forty-six salmon purse-seine and drag-seine licenses were granted to returned soldiers only during the year. There were 150 applications and it could be well understood that the forty-six successful applicants could not be decided upon without creating great dissatisfaction amongst those who were unsuccessful. Whilst there may have been one or two licensees who did not fill expectations it was generally conceded that the best possible had been done considering the great number of applications and the small number of locations available.

Very few, if any, of these men had the financial means to operate their licenses and if they are to be encouraged in the direction of fishing as a means of earning a livelihood they must be given some financial assistance by the Government on the same basis as returned soldier citizens desiring to enter other fields of activity. Until this is done there must of necessity be a bartering in licenses which will not lead in the direction of building up a white fishing industry but will tend to place the actual operations of the licenses in the hands of others than the licensees. A white fishing population is desirable and this does not mean a fisherman who will fish for a few months during the salmon run but one who will follow the fishing the year round in the different seasons, viz., salmon, herring, halibut and cod, thus providing employment for the whole year and building up a thrifty and prosperous white fishing population.

During the season of 1919 a judicial investigation was held into the actions of the fishery officers in District No. 3. Charges of all kinds were filed against the officers and his Honour Judge Eberts was appointed by the Government to investigate the same. All evidence was taken under oath and it is satisfactory

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to note that not one solitary charge was proven, but it was an unfortunate waste of time and public money. One good feature, however, may have emanated from the investigation in so far as it set at rest in the public mind wild rumours of graft and maladministration of the fisheries in this province generally.

Attention is called to the large exportation of raw material in fish from this province to the United States. Such exportation is not in my opinion in the interests of the country as a whole. The manufacture of this raw material in Canada would result in a greater opening for labour and the distribution of money generally and would be a very strong factor in the procuring of foreign markets. Our competitors to the south have a very large home market for their canned goods and it is very questionable if the raw material were not obtained from Canada whether these foreign markets could be retained by them. It is claimed by the fishermen that an embargo on exportation would mean smaller results to them. This remains to be proved, as the manufacture of the raw material at home would mean the erection of new plants by foreign capital who would enter into competition with those already in the business, in buying fish, a greater competition amongst those now in the business which would be enabled by increased foreign trade, so that in my opinion the province and the Dominion has everything to gain and nothing to lose in manufacturing the raw products at home.

Whilst the manufacture of by-products is on the increase there is a wide field for extended operations. In certain localities there are large quantities of sharks, sea-lions, hair seals and porpoises, all of which can be used in the manufacture of leather and oil. The demand for these finished products is great, as is also the demand for chicken and cattle food manufactured at these establishments a growing one, and the field opens wide possibilities for enterprise.

The waters abound with all varieties of flatfish which are of great value as a palatable and nutritious food. This is another field open for enterprise and which should receive the special attention of the newly formed Publicity and Marketing Branch of the department.

In closing I wish to refer to the good work done by the Fisheries patrol steamer *Givenchy*, commanded by Captain Laird. This boat was one of the trawlers brought from the Atlantic coast and utilized in the Fisheries patrol service of this province. She is a most seaworthy boat and eminently suitable for work on this coast, and replaced the Fisheries patrol launch *Fispa*, which was transferred for service in District No. 3 under Inspector E. G. Taylor, replacing the *Alcedo*, sold by public auction.

The headquarters of the Dominion Fisheries Service were transferred in the beginning of the year from New Westminster to Vancouver. This transfer was only decided upon by the department after mature deliberation as the fisheries of British Columbia had been for so long associated with the Fraser river that there was a strong sympathetic feeling, but as the lines of progress had to be maintained there was no alternative and the transfer was subsequently authorized. The office is now installed in the Rogers block, a most up-to-date building on Granville street. The offices are commodious and a great convenience to both the staff and the public.

The past year has been a very strenuous one from the standpoint of the staff at headquarters and in the various districts. One and all have given the best of their ability to the service, great credit being due the district inspectors and fishery overseers generally for the satisfactory manner and willingness in which their duties were performed at all times, and it is to be regretted that the remuneration as provided by the Civil Service Commission is not more in keeping with the services required from these men and the responsibilities placed on them.

APPEN

NATURAL HIS

The following subjects are treated of:—

Lobster observations made at coasts of the Bay of Fundy, N.B., and at Investigations into the condition of the scallop at Mahone bay, N.S.

Remarks on the metamorphosis of the scallop.

Identification of a collection of specimens from Hudson bay waters, received

The following tabulation of measurements of lobsters is adjusted so that together with dates when the catches were made, can be seen at a glance.

A tabulation of Lobster measurements based on observa

1919.	St. Martins—13th May.			Mispec—19th May.			*Big Wood Island—28th May.		
Inches.	Males.	Females.	Totals.	Males.	Females.	Totals.	Males.	Females.	Totals.
6									
6½									
6¾									
7									
7½									
7¾	1		1		1	1			
7¾		1	1	2		2			
8								1	2
8½		1	1	1	4	5	2	1	3
8¾	2		2	3	5	8	2	1	3
8¾				3	2	5	1	2	3
9		3	3	1	5	6	5	3	8
9½		2	2	5	5	10	3	3	6
9¾		1	1	7	4	11	3	1	4
9¾	1	1	2	4		4	7	3	10
10		1	1		2	2	3	4	7
10½	3	3	6				5	2	7
10½	2	1	3				4	1	5
10¾		1	1		1	1		1	1
11							3		3
11½	3	2	5					3	3
11½	2	2	4		1	1	1	1	2
11½	2	1	3				1		1
12	1		1				2	1	3
12½	1	1	2		1	1	1		1
12½		3	3	1		1		1	1
12½	2		2						
13	2		2						
13½	1	1	2						
13½	1		1						
13½									
14	1	2	3						
14½	1		1						
14½				1		1			
15		1	1			1	1	1	2
15½				1		1			
15½		1	1						
	26	29	55	29	30	59	45	29	74

\*1 mutilated male, which could not be measured, may be added—46 males.  
Mutilated male added—75 lobsters.

*[Faint handwritten notes]*

DIX 2

## TORY REPORT.

coasts of the Magdalen Islands, P.Q.

their sizes for different localities at the Bay of Fundy and the Magdalen Islands,

tions made at the Bay of Fundy and the Magdalen Islands.

[illegible]

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The following denotes a catch, made on July 14, at Entry island, which was placed for a limited time at my disposal for examination before it was conveyed across the channel to Savage's cannery at Havre Aubert, Amherst island:—

64 males, 80 females=144 lobsters.  
 Weight of males—69 lbs.  
 Weight of females—61 lbs. Total—130 lbs.

The Havre Aubert and Entry island catches were practically from the same water areas.

There were no seed-lobsters among the females in any of the catches in the Bay of Fundy. The following shows the condition of the eggs of seed-lobsters, and of lobsters with the eggs just hatched off the swimmerets at the Magdalen Islands:—

Havre Aubert, July 2—		
90 females—2 with eggs hatched off.	1, 9 in.	eggs hatched off.
	1, 10½ in.	eggs just hatched off.
	—	
	2	
Entry Island, July 4—		
59 females—6 seed lobsters.	2, 9 in.	eggs not ripe.
	1, 9½ in.	eggs almost ripe.
	2, 10 in.	eggs not ripe.
	1, 10½ in.	eggs not ripe.
	—	
	6	
Entry Island, July 9—		
32 females—5 seed lobsters.	1, 9 in.	eggs almost ripe.
	1, 9½ in.	eggs not ripe.
	2, 10½ in.	eggs not ripe.
	1, 11 in.	eggs almost ripe.
	—	
	5	
Entry Island, July 14—		
32 females—9 seed lobsters.	1, 9 in.	eggs hatching.
	2, 9½ in.	eggs not ripe.
	1, 9½ in.	eggs ripe.
	1, 10 in.	eggs nearly hatched off.
	1, 10½ in.	eggs hatching.
	1, 10½ in.	eggs hatching.
	1, 10½ in.	eggs hatching.
	1, 11½ in.	eggs ripe.
	—	
	9	
Entry Island, July 14—		
80 females—1 seed lobster	1, 10½ in.	eggs nearly hatched off.

There may be a question concerning the seed-lobsters in the first and the last given of the above. The former was made at the wharf of the cannery after the catch had been brought in, and I found two females with the eggs recently hatched off, but Mr. Savage could not absolutely assure me concerning the release of seed-lobsters; and the latter, as mentioned above, was examined just before being conveyed across the channel, and whilst I found a lobster in the catch with the eggs nearly hatched off, I was again unable to ascertain whether or not any seed-lobsters had been released. Cannerymen at the Magdalens will not knowingly receive seed-lobsters, therefore, possibly there were some released before the catches were brought in. This question is raised because by eliminating the two catches where there is doubt as to whether any seed-lobsters were released or not, the percentage of seed-lobsters among the females rises from about 7.9 to about 16.3. In other words, 23 seed lobsters (and the two with the eggs recently hatched off are included in them) in 293 females approximate 7.9, whilst 20 seed-lobsters in 123 females approximate 16.3.

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The following tabulation affords a comparison between the full-length and carapace measurements of 29 of the males, and 2 of the females in the Big Wood island catch. There were, as shown above, 46 males and 29 females, making a total of 75 lobsters in this catch. I seized an opportunity against the setting of the sun, and the holding of a campaign meeting in the school-house that night, to make those carapace measurements, but was unable to make carapace measurements of all the lobsters, and had, therefore, to desist in order to complete the full-length measurements of the balance. These measurements, however, were made very carefully, and, as a check on their exactness, with the help of a fisherman. My motive in making them was to establish a standard for the full-length and carapace measurements of the different sized lobsters.

The tabulation referred to here follows:—

	Carapace.		Full Length—	inches.	
Males.....	3½ in.	8			1
	4	8½			1
	4½	9	9	9½	4
	4½	9	9½	9½	7
	4½	10	10½	10½	6
	5	10½	10½	11	3
	5½	11	11½		2
	5½	11½			1
	5½	12	12	12½	3
	7½	15			1
					29
Females.....	5 in.	10½			1
	6½	15			1
					2

During the summer I devoted considerable time to an investigation into the condition of the scallop at Mahone bay, Lunenburg county, N.S., as it had been reported to the department that the scallop fishery, owing to the heavy drain upon it was on the verge of being depleted. Reports of mine, placed on file, show what my findings were, and my recommendations for the conservation of that local industry, and I understand that the question of its proper protection is at present under consideration. The tenor of my reports (barring its use for catering purposes during the tourist season) emphasized the urgency of a rest for the scallop, in order to maintain the resource at its full productivity. My investigations were industrial (that is, they were carried on in the direct interests of commerce) and studies in natural history; and concerning the latter the following article already published in an issue of the "Canadian Field Naturalist" is here reproduced, under the title, "REMARKS ON THE METAMORPHOSIS OF THE SCALLOP (*Pecten tenuicostatus*)."

The scallop undergoes a metamorphosis. After hatching out, the young scallops attach themselves to rocks, scallop shells, or other objects, to which they remain as fixtures for a year or two. I can tell this from numerous young specimens obtained which possess an aperture through which a portion of the creature protrudes for attachment, and from a few specimens I came across which possess an elastic byssus for attachment, which protrudes from the so-called foot, and also from the margins of growth, the striations, and other points of structure which undergo a modification.

In the earlier stages the byssal attachment appears to agree with that of *Anomia* throughout the life-history of that genus. That is there is an aperture near the apex of the under valve through which a portion of the mollusk itself protrudes, so that it is directly attached to the object. But its agreement with *Anomia* in this respect is only temporary, for in time the scallop develops a byssus which is of elastic constituency such as the mussel (*Mytilus*) possesses

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throughout its life-history. In the instance of the scallop again this provision is only temporary, for in time as it continues to grow, the byssus disappears, and the scallop is free and can then move about by the flapping of its valves.

Sometimes I was able to determine a stage of development from a single example. For instance, the fact that at one time in its life history the scallop develops an elastic byssus secreted from the foot for attachment to an external object. Two other specimens of the same character were obtained, but the byssus of one of them had been broken off in the raking, and it was found lying loose, and the other, a much smaller one, was also detached from the object.

Considering that the byssus always occurs on the same side of the scallop, and that the aperture of the more immature form extends to the margin of the valve, it is evident that the elastic elongation simply evolves from the original attachment, and that the aperture of the under valve as it becomes obliterated, leaves the scallop, except that it is now moored to an external object, otherwise free.

Judging from an illustration from Parker and Haswell, these zoologists seem to regard the pectens as hermaphrodite, as they show one part of the gonad in the same individual as male, and the other as female. But this is not so, at least in the case of the scallop. The sexes are distinct, and out of 209 scallops specially examined by me in my observational work, 100 were males, 108 females, and in one the sex was indeterminable. The gonad of this last mentioned was completely empty, not that I consider the scallop had spawned, for it was impoverished generally, and apparently in a sickly condition. I might have been able, had I known it at the time, to determine the sex by the digestive organs, but this was a later discovery. This fact, however, helps to emphasize what I say as to the sexes being distinct. The gonad of the male is cream coloured, and the stomach and its appendages grey, whereas the gonad of the female is a sort of brick red colour, and the stomach and its appendages brown.

The following is a list of the specimens of fishes and invertebrates collected in Hudson bay waters in 1919, with the localities where they were collected, and on what dates, by Rev. W. G. Walton, missionary at Fort George, P.Q. After examination the specimens were transferred to Dr. A. G. Huntsman of the Biological Department, University of Toronto.

Sand Lance (*Ammodytus americanus*)—two specimens, Long Point, 15 miles east of cape Jones, August 5.

Capelin (*Mallotus villosus*)—One specimen, Long Point, 15 miles east of cape Jones, August 3.

Daddy Sculpin (*Myoxocephalus groenlandicus*)—Two specimens, Long Point, 15 miles east of cape Jones, August 5.

Long-horned Sculpin (*Oncocottus hexacornis*)—One specimen, Long Point, 15 miles east of cape Jones, August 5.

Common Stickleback (*Gastrosteus aculeatus*)—Fifteen specimens, near Great Whale river, July 26. Two sea-urchins in same wrapping.

Nine-spined Stickleback (*Pygosteus pungitius*)—Two specimens, lake near Great Whale river, July 26.

Common Stickleback (*Gastrosteus aculeatus*)—two specimens, Fort George river, James bay, September 8, ten young cyprinoids in same phial.

Greenland Codfish (*Gadus ogac*)—two specimens, Great Whale river, July 20.

Daddy Sculpin (*Myoxocephalus groenlandicus*)—Male, Great Whale river, July 22; male, Long Point, 15 miles east of cape Jones, August 3; female, Great Whale river, July 20.

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Long-horned Sculpin (*Oncocottus hexacornis*)—Female, Great Whale river, July 25. A stickleback in same wrapping.

Arctic Charrs, presumable varieties of the European Charr (*Salvelinus alpinus*)—Two specimens, Great Whale river, July 25; 2 specimens, Long Point, 15 miles east of cape Jones, August 1 and 2.

Round Whitefish (*Coregonus quadrilateralis*)—Three specimens, Great Whale river, July 22; 1 specimen, Long Point, 15 miles east of cape Jones, August 4.

Starfish (*Crossaster*) Great Whale river, July 25.

Starfish (*Asterias*) near Great Whale river, July 20.

Starfish (*Asterias*) Long Point, August 4, Amphipod in same wrapping.

Starfish (*Urasterias*) near Great Whale river, July 20.

Sea Cucumber (*Cucumaria*)—Two specimens, Long Point, August 4.

Amphipod—(Two specimens, and alcyonarian (*Alcyonium*)—10 miles northwest of Great Whale river, July 12. Caddis-fly tube (fresh water) in same phial

Invertebrates found loose among the material without labels or data:—

Two sea-urchins (*Strongylocentrotus drobachiensis*) one mussel (*Mytilus edulis*), and 3 crabs (*Hyas coarctatus*), 2 males and 1 female.

The following is quoted from my letter to Dr. Huntsman, when forwarding the specimens: "The Arctic charrs and the whitefish are not in good condition, but I regard the former as varieties of "*Salvelinus alpinus*", and the latter, having neither the form of *Coregonus clupeiformis*, nor the teeth of *C. Labradoricus* I provisionally regard as *C. quadrilateralis*. Until some of the Arctic salmonoids can be received in a fresh condition, it is hard to be certain of some specific differences. Of all our fishes the whitefishes are more involved in distinctions of varieties than are those of almost any other group, and I sometimes question that some are entitled to specific rank."

The following is quoted from Dr. Huntsman's letter to me when acknowledging receipt of the specimens:—

"The fishes seem to be quite interesting. So far as I have examined them up to the present, the sticklebacks appear to be the form which is only partly mailed, that is the one called *cuvieri* by Jordan and Evermann. The white fishes seem to belong to two different species, but I have not yet gone into them very closely."

Mention may also here be made of a specimen of the spring salmon from the Pacific coast, which was sent by Mr. R. C. W. Lett, Industrial and Colonization Agent, Winnipeg, for identification; and the following is quoted from my letter to him in identifying it:—

"It is a specimen of the quinnat, otherwise known as the spring salmon, or king salmon. It frequents both coasts of the Pacific and their slopes, and ranges from California to Behring straits and China, and ascends the large streams from the sea, sometimes making its way to great distances. It is, therefore, anadromous, and attains a length of from two to five feet."

A specimen also of the so-called mud-minnow (*Umbra limi*) was received from the provincial fishery officer of Arden, Ont., for identification, and a note descriptive of it and of the other species of *Umbra* is on file; and Overseer Torrie sent a specimen of a lobster, coloured blue, which was found at Little river, Digby county, N.S. The blue colour, as was to be expected, has since faded in the preservative fluid.

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## APPENDIX 3.

List of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the year ended December 31, 1919.

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Acushla.....	70	23	4
Agnes.....	65	19	2
Albatross.....	167	32	4
Alice A. Wilson.....	16	8	6
Angeline C. Nunan.....	58	16	5
Angie B. Watson.....	36	14	2
Annie Belle.....	37	7	1
Annie M. Parker.....	100	20	2
Arethusa.....	88	25	4
Arthur James.....	99	20	2
Athlete.....	96	10	3
Authentic.....	250	30	1
Avalon.....	69	19	2
Bay State.....	81	25	8
Benjamin A. Smith.....	75	25	8
Bettina.....	120	17	2
Blanche F. Irving.....	14	7	3
Catherine.....	103	26	4
Catherine Burke.....	92	23	6
Cavalier.....	96	20	4
Commonwealth.....	93	21	4
Constellation.....	89	19	5
Corinthian.....	89	26	7
Corsair.....	71	17	1
Dawn.....	79	21	1
Desire.....	21	10	0
Edna G.....	67	18	1
Edith G.....	11	2	1
Eleanor.....	36	11	9
Elizabeth and Ruth.....	38	6	1
Elizabeth N.....	102	23	4
Elizabeth W. Nunan.....	48	17	11
Eliza L. Spurling.....	49	16	1
Elk.....	66	23	7
Ellen and Mary.....	97	23	2
Ellen T. Marshall.....	75	19	2
Elmer E. Gray.....	71	23	8
Elsie.....	98	21	4
Elsie G. Silva.....	50	20	7
Esperanto.....	91	22	3
Ethel B. Penny.....	56	16	4
Fannie Belle.....	16	7	10
Fannie Belle Atwood.....	81	20	5
Fannie E. Prescott.....	74	21	2
Fish Hawk.....	150	31	2
Flora L. Oliver.....	59	19	7
Florence.....	134	18	1
Fox.....	8	6	3
Frances S. Grueby.....	95	25	3
Genesta.....	53	19	3
Gertrude.....	61	19	1
Gertrude de Costa.....	61	19	2
Gladiator.....	75	7	1
Gladys and Nellie.....	52	18	3
Gleaner.....	23	9	7
Gloucester (trawler).....	250	31	5
Good Luck.....	55	19	11
Harmony.....	66	19	4
Harvard.....	72	19	3
Hazel R. Hines.....	79	21	13
Helena.....	40	17	2
Helen E. Murley.....	5	5	7
Henrietta.....	62	19	4
Henry L. Marshall.....	42	15	1
Herbert Parker.....	78	23	5
Hesperus.....	79	25	6
Hilda Silva.....	77	19	3
Hortense.....	43	19	2
Imperator.....	79	25	2
Ingomar.....	85	23	14

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Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
James and Esther.....	47	14	4
James W. Parker.....	96	23	5
James and Arthur.....	47	17	1
Jeanetta.....	66	19	3
Joffre.....	80	25	3
John D.....	12	6	6
John J. Fallon.....	60	21	6
Judique.....	89	19	3
Killarney.....	73	25	11
Kineo.....	71	19	3
Laverna.....	96	24	10
Leonora Silveira.....	51	21	5
Little Elsie.....	11	7	4
Lois H. Corkum.....	34	12	2
Louisa R. Sylvia.....	92	25	6
Louise Howard.....	116	10	1
Lucia.....	43	18	3
Mabel E. Bryson.....	23	7	4
Margaret.....	72	18	2
Margaret E. Haskins.....	70	18	2
Margie E. Turner.....	40	14	4
Marjorie Turner.....	41	14	3
Marion McLoon.....	11	8	4
Marshal Foch.....	64	25	2
Mary.....	93	24	1
Mary de Costa.....	62	17	9
Mary E. Harty.....	77	19	2
Mary F. Curtis.....	65	19	12
Matthew S. Greer.....	66	19	3
Mildred Robertson.....	75	18	3
Minerva.....	13	4	6
Monarch.....	83	19	7
Morning Star.....	85	24	3
Motor.....	17	8	5
Mystery.....	65	19	4
Natalie Hammond.....	67	21	4
Norma.....	65	23	5
Nyoda.....	28	11	2
Ralph Brown.....	67	19	2
Rattler.....	35	8	1
Reading.....	92	23	6
Rebecca.....	49	19	3
Regina.....	111	22	4
Republic.....	48	19	3
Restless.....	35	8	3
Rex.....	75	23	6
Richard J. Nunan.....	55	16	12
Robert and Arthur.....	67	19	10
Romance.....	96	23	6
Rose Standish.....	25	8	5
Rhodora.....	70	19	1
Russel.....	67	19	5
Ruth.....	49	17	3
Ruth and Margaret.....	97	25	4
Sadie M. Nunan.....	36	16	10
Saladin.....	89	19	3
Sea Bird.....	169	31	6
Senator.....	74	8	1
Sibyl.....	18	7	2
Silveira.....	51	19	1
Squanto.....	81	23	17
Somerville.....	82	22	3
Stiletto.....	136	19	4
Sunapee.....	18	8	5
Teazer.....	59	19	5
Thelma.....	28	12	2
T. M. Nicholson.....	90	23	3
Valentina.....	28	12	16
Victor.....	75	20	2
Vida McKeown.....	83	20	2
Viking.....	34	16	1
Waltham.....	47	17	2
Waldo L. Stream.....	85	21	1
William H. Ryder.....	45	18	2
Totals, Atlantic.....	9,815	2,588	622

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List of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1919.

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Active.....	25	6	1
Adelphi.....	21	3	15
Adeline.....	6	4	9
Agnes.....	17	5	3
Alameda.....	4	4	10
Alaska.....	44	15	10
Albatross.....	40	13	14
Albatross.....	16	5	24
Alfred.....	13	3	3
Alice B.....	13	5	4
Almara.....	49	6	1
Alpha.....	12	5	4
Alten.....	43	15	11
Alvilda.....	18	13	4
America.....	25	5	3
Anna J.....	22	5	5
Anna J. Larsen.....	25	11	5
Annie.....	11	4	2
Apache.....	77	5	3
Arctic.....	29	11	2
Atlantic.....	25	11	5
Atlas.....	31	11	7
August.....	19	4	2
Augusta.....	19	5	3
Aurora.....	13	5	2
Baldy.....	7	3	10
Baltic.....	24	5	2
Bartalome.....	4	3	10
Bear.....	31	5	1
Beaver.....	17	5	5
Behring Sea.....	44	5	12
Blue Sea.....	23	8	20
Bravo.....	4	3	13
Bring Gold.....	12	5	11
Brothers.....	13	5	9
Cape Spencer.....	11	5	4
Carlisle.....	10	2	1
Cascade.....	14	2	16
Cedric.....	7	3	1
Celtic.....	4	2	1
Charlotte B.....	15	3	1
Chimera.....	9	4	4
City of Blaine.....	26	4	1
Clara.....	6	5	19
Cleopatra.....	33	5	8
Coaster.....	10	2	1
Commonwealth.....	60	16	3
Companion.....	10	3	2
Constance.....	53	15	3
Constitution.....	39	13	10
Convention.....	20	5	15
Cora.....	4	3	8
Corona.....	19	11	9
Crescent.....	14	5	4
Daisy.....	18	8	7
Deep Sea.....	35	5	4
Delphinium.....	20	5	4
Democrat.....	27	6	8
Dick.....	10	4	3
Dip.....	4	3	14
Director.....	12	4	13
Dolphin.....	7	4	13
Dorothy Hulbert.....	20	8	12
Eagle.....	15	6	7
Eastern Point.....	4	3	15
Eclipse.....	24	6	5
Eidsvold.....	15	5	14
Einer Beyer.....	92	6	3

## SESSIONAL PAPER No. 40

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times entered.
Eleanora.....	16	5	1
Elfin.....	4	2	3
Emblem.....	4	3	5
E. Neilson.....	15	3	4
Ethelyn.....	4	2	5
Eureka.....	4	2	2
Evolution.....	17	5	7
F. C. Hergert.....	15	5	1
Fenwick.....	27	4	1
Fisher.....	14	6	15
Flamingo.....	13	5	3
Flattery.....	10	3	8
Flivver.....	3	2	3
Fortuna.....	21	5	5
Forward.....	18	5	2
Fram.....	4	3	4
Frances E.....	58	5	6
Freedom.....	28	5	4
George Washington.....	13	2	6
Gilford.....	12	4	1
Gjoa.....	13	5	10
Glacier.....	10	5	4
Golden Gate.....	23	4	2
Goney.....	12	5	7
Grace J.....	3	2	1
Gradac.....	22	7	1
Grayling.....	16	5	15
H. & R.....	4	3	23
Hanna.....	11	5	2
Happy.....	17	4	2
Harder.....	8	3	1
Harvester.....	15	5	3
Hattery.....	10	4	1
Helena.....	18	5	14
Helen D.....	8	5	1
Helgeland.....	56	15	6
Hellenic.....	24	6	2
Hergert.....	15	5	10
Hilda.....	10	3	12
Hillside II.....	28	4	4
Holdal II.....	4	3	10
Home.....	9	3	1
Hulda.....	6	3	1
Husky.....	19	2	3
Ida.....	7	2	2
Imperial.....	23	8	10
Jean.....	9	2	2
Jeannie.....	14	4	1
Jennie.....	14	4	1
Jennie F. Decker.....	16	8	9
Jessie Island.....	19	3	1
Johanna.....	23	5	3
J. P. Todd II.....	12	4	3
June.....	15	5	4
King and Wing.....	97	22	6
Kingfisher.....	14	4	2
Kingsmill.....	38	6	3
Klatawa.....	15	3	2
Kodiak.....	38	13	16
Lansing.....	16	5	10
La Paloma.....	14	11	12
Lebanon.....	14	5	14
Lenore.....	14	4	6
Liberty.....	44	15	18
Lincoln.....	17	4	11
Lister.....	14	5	1
Livingston.....	24	6	8
Louise.....	16	6	7
Lovera.....	4	4	1
Lumen.....	10	4	10
Lummi No. 2.....	38	5	4

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Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times entered.
Mabel A.....	22	5	5
Madeline J.....	21	5	4
Magdalene.....	27	4	2
Maghuel.....	6	3	15
Malolo.....	9	11	11
Margaret J.....	10	4	4
Mars.....	14	4	1
Mary.....	16	8	14
Mildred.....	19	8	9
Missawit.....	36	2	1
Miyako.....	18	3	2
Morengen.....	17	5	1
Morzhovia.....	62	6	4
Myrtle.....	9	4	13
Navigator.....	13	4	8
Nellie.....	4	3	1
New England.....	70	32	4
Newcastle No. 6.....	64	5	2
Niagara.....	13	4	14
Nidaros.....	13	5	17
Nomad.....	15	5	4
Nora.....	16	2	2
Norland.....	19	5	3
Norma.....	6	3	14
North.....	9	3	11
North Cape II.....	4	3	10
North Star.....	12	5	8
North Western.....	19	5	1
Olympic.....	30	11	15
Omaney.....	34	14	8
Onah.....	18	5	13
Orient.....	48	13	9
Pacific.....	26	11	6
Panama.....	24	13	19
Panther.....	30	4	2
Pauline.....	14	5	5
Pershing.....	18	5	7
Petrel.....	4	3	1
Pioneer.....	48	15	11
Pioneer III.....	26	5	2
Polaris.....	45	15	10
Presho.....	14	5	9
President II.....	23	3	2
Progress.....	6	2	7
Rainier.....	4	3	9
Republic.....	51	15	11
Reliance.....	14	4	13
Restitution.....	24	5	8
Road Amundsen.....	16	4	1
Rolf.....	6	3	1
Rolfe.....	10	5	3
Roosevelt.....	13	5	4
Rosario.....	16	5	11
Royal.....	15	4	1
Rush.....	254	14	4
S. & S.....	4	3	11
Sadie K.....	13	5	7
Sammy.....	8	3	3
San Francisco.....	33	2	1
Sarah.....	9	2	1
Saturn.....	4	3	5
Scandia.....	79	17	7
Scout.....	5	2	1
Seattle.....	55	15	17
Senator.....	11	11	10
Seymour.....	44	14	10
Shamrock.....	21	4	4
Signal.....	13	4	2
Siloam.....	16	5	15
Sitka.....	50	16	7
Speculator.....	9	4	23
Spencer.....	17	5	3

## SESSIONAL PAPER No. 40

Name of Vessel.	Tonnage.	Number of Men In Crew.	Number of Times Entered.
Stamsund.....	14	3	1
Standard.....	10	2	1
Star.....	12	3	8
Stranger.....	6	3	1
Success.....	4	4	2
Sumner.....	34	8	5
Sunrise.....	24	2	1
Sunset.....	24	4	2
Sunwing.....	15	5	3
Superior.....	16	5	4
Swiftsure.....	22	5	14
Taboo.....	16	3	1
Tahoma.....	18	10	14
Tatoosh.....	24	5	13
Texas.....	16	5	6
Thelma.....	4	3	2
Tillicum.....	21	5	12
Titanic.....	9	4	1
Tom and Al.....	57	15	13
Tordenskjold.....	39	13	14
Totem.....	8	2	1
Treo.....	28	5	1
Trio.....	19	8	3
Tyee.....	89	20	10
Tyu.....	12	4	1
Tzartoos.....	22	6	6
U. & J.....	19	3	2
Una Mae.....	26	2	1
Uranus.....	15	5	4
Valid.....	8	3	5
Vansee.....	43	15	11
Venus.....	3	3	14
Venus.....	25	6	2
Vesta.....	13	5	12
Vienna.....	17	5	17
Viking.....	10	4	18
Vivian.....	9	3	2
Volunteer.....	21	5	19
Voyageur.....	3	3	1
Washington.....	24	11	9
Wee Wee.....	4	2	1
West Coast.....	22	5	6
Westfjord.....	17	6	5
White Star.....	17	4	7
Wilhelmina.....	17	5	4
Wilson.....	19	5	7
Wireless.....	17	5	7
Woodrow.....	23	5	5
Yakutat.....	41	15	10
Yellowstone.....	22	5	9
Zilla May.....	56	13	11
Totals, Pacific.....	5,552	1,523	1,700

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## APPENDIX 4.

## FISHERIES EXPENDITURE, 1919-20.

	Appropriation.	Expenditure.
	\$ cts.	\$ cts.
Salaries and disbursements, F.O.....	\$294,492 22	
Fisheries Patrol Service.....	291,246 27	
Oyster Culture.....	6,065 62	
Fish Breeding.....	365,000 00	305,476 75
Deep Sea Fisheries and transportation fresh fish.....	100,000 00	79,581 75
Building Fishways.....	30,000 00	29,831 72
Legal and Incidental Expenses.....	4,000 00	1,840 76
Fisheries Intelligence Bureau.....	5,000 00	1,614 85
Inspection of pickled fish.....	15,000 00	7,238 28
Marine Biological Board.....	26,000 00	26,000 00
Scientific investigation into fisheries.....	10,000 00	
Compassionate Allowance to Mrs L. F. Ogilvie.....	1,000 00	1,000 00
Totals.....	1,156,000 00	1,044,388 22
Fishing Bounty.....	160,000 00	155,136 70
Paid out of Consolidated Revenue Fund.....		16,556 93

Provinces.	Salaries and disbursements of F.O.	Fish Breeding.	Fisheries Patrol Service.	Building Fishways and Clearing Rivers.	Inspecting Canned and Pickled Fish.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	64,897 03	16,243 01	31,014 36	1,727 65	2,748 80
P.E. Island.....	11,236 85	2,918 40	4,346 23		
New Brunswick.....	53,756 11	34,275 01	17,470 80		2,760 62
Quebec.....	8,405 17	13,125 26	33,679 99		
Ontario.....		75,479 78	188 83		247 00
Manitoba.....	8,615 30	26,379 94	21,176 75		
Alberta.....	18,994 11	7,203 06			
Saskatchewan.....	15,633 19	4,147 16			
British Columbia.....	92,073 18	111,918 01	167,180 77	27,981 59	992 55
Yukon.....	11 65				
General Account.....	20,869 63	13,787 12	16,188 54	122 48	489 31
Totals.....	294,492 22	305,476 75	291,246 27	29,831 72	7,238 28

## FISHERIES REVENUE, 1919-20.

Provinces.	Amount Collected.	Refunds.	Net Amount.
	\$ cts.	\$ cts.	\$ cts.
Ontario.....	1,421 80		1,421 80
Quebec.....	8,085 78		8,085 78
New Brunswick.....	16,461 02	20 00	16,441 02
Nova Scotia.....	10,220 28	7 00	10,213 28
Prince Edward Island.....	4,781 68	40 00	4,741 68
Manitoba.....	12,154 17	15 00	12,139 17
Saskatchewan.....	4,336 00	15 00	4,321 00
Alberta.....	8,318 85	5 00	8,313 85
British Columbia.....	270,899 41	201 00	270,698 41
Yukon.....	215 00		215 00
Total.....	336,893 99	303 00	336,590 99

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## APPENDIX 5.

The following is a statement showing the number of licenses of the different kinds, issued in each Province during the 1919-20 Season:—

QUEBEC.		No. Issued.
Kind of License—		
Lobster Packing.....	53	
Lobster Extensions, 19.....		
Lobster Fishermen's.....	568	(6 cancelled)
Fish Cannery.....	3	
Salmon Fishery.....	159	(4 cancelled, 1 free)
Herring Trap Net.....	46	(1 cancelled)
Cod Trap Net.....	274	(6 cancelled)
Rental of Salmon Fishing Privileges in the estuary of St. John River.....	1	
	<hr/>	
	1,103	

## PRINCE EDWARD ISLAND.

Lobster Packing.....	191	
Lobster Extensions, 92.....		
Quahaug Fishery.....	14	
Fish Cannery.....	10	
Lobster Fishermen's.....	1,903	
Smelt Gill Net.....	171	
Smelt Bag Net.....	244	(2 cancelled)
Oyster Fishery.....	196	
Trap Net.....	7	
	<hr/>	
	2,736	

## NOVA SCOTIA.

Lobster Packing.....	152	(1 cancelled)
Lobster Extensions, 112.....		
Special Angling Permits.....	264	(4 free)
Fish Cannery.....	25	
Lobster Fishermen's.....	8,164	(1 cancelled)
Smelt Gill Net.....	259	
Smelt Bag Net.....	175	(1 cancelled)
Oyster Fishery.....	150	
Trap Net.....	233	(2 cancelled)
Salmon Net.....	21	
Drag Seine.....	141	(1 cancelled)
Herring Weir.....	103	
Trap Net Extensions, 1.....		
Scallop Fishery.....	257	
Lobster Pound.....	8	
Lobster Pound Certificates, 192.....		
	<hr/>	
	9,952	

## NEW BRUNSWICK.

Lobster Packing.....	463	
Lobster Extensions, 29.....		
Fish Cannery.....	8	
Lobster Fishermen's.....	1,938	
Scallop Fishery.....	2	
Clam Permits.....	3	
Herring Weir.....	893	
Bass Gill Net.....	34	
Quahaug Fishery.....	6	
Salmon Fishery.....	523	
Smelt Gill Net.....	110	
Smelt Bag Net.....	2,479	(24 free)
Oyster Fishery.....	322	
Bass Fishery.....	29	(6 free)
Sturgeon Fishery.....	3	
Salmon Net Permits.....	71	
Whitefish Fishery.....	5	
Lobster Pound Licenses.....	3	
Lease of Dark Harbour.....	1	
	<hr/>	
	6,643	

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## MANITOBA.

Special Fishery.....	1,951 (4 cancelled)
Settler's Permits.....	299 (1 cancelled)
Commercial Sturgeon.....	87
Domestic Sturgeon.....	Nil.
Receipts, 811.....	
	<hr/> 2,337

## SASKATCHEWAN.

Fish Cannery.....	Nil
Commercial and Fishermen's.....	672 (4 cancelled)
Domestic.....	179 (18 cancelled, 1 free)
Indian and Half-breed.....	673
Commercial Sturgeon.....	16
Domestic Sturgeon.....	9
Angling Permits.....	9
	<hr/> 1,558

## ALBERTA.

Angling Permits.....	4,745 (2 cancelled, 6 free)
Commercial and Fishermen's.....	676 (3 cancelled)
Domestic Fishery.....	194 (19 cancelled)
Indian and Half-breed Permits.....	313
Commercial Sturgeon.....	Nil
Domestic Sturgeon.....	Nil
Receipts, 1,700.....	
	<hr/> 5,928

## BRITISH COLUMBIA.

Special Angling Permits.....	68
Abalone Fishery.....	Nil
Fish Cannery.....	17
Indian Permits.....	193
Gill-Net, Drift-Net or Drag Seine Licenses operated in conjunction with power boats.....	367
Smelt or Sardine.....	84 (3 cancelled)
Crab Fishery.....	107
Salmon Cannery.....	82
Salmon Trap Net.....	21 (1 cancelled)
Salmon Purse Seine.....	141 (2 cancelled)
Com. Fishery for Salmon Trolling.....	2,260
Salmon Drag Seine.....	104 (2 cancelled)
Sturgeon Fishery.....	1
Herring or Pilchard, Gill-net or Drift-net.....	67
Herring Drag Seine.....	3
Herring Purse Seine.....	53
Salmon Gill-net or Drift-net.....	4,613 (18 cancelled)
Reduction Works Licenses.....	12
Herring Drag Seine or Purse Seine for Halibut fishing vessels.....	Nil
Boat Licenses to buy fresh salmon from fishermen.....	205
B.C. Licenses to persons engaged in cold storage or fish packing to buy fresh fish from fishermen.....	162 (8 cancelled)
Whale Factory.....	3
	<hr/> 8,563

## YUKON TERRITORY.

Yukon Special Fishery.....	16
	<hr/> 16

Total Number of Licenses issued..... 38,836

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The following is a statement showing the number of prosecutions, confiscations and sales which took place in each province, during the 1919-20 season.

Province of	No. Prosecutions.	Revenue Received.	No. Confiscations.	Revenue from Sales.
		\$ cts.		\$ cts.
Quebec.....	14	590 00	5	117 00
Prince Edward Island.....	52	1,423 00	17	607 57
Nova Scotia—				
District 1.....	1	20 00	8	5 50
District 2.....	27	323 00	22	111 10
District 3.....	11	93 50	10	34 75
New Brunswick—				
District 1.....	30	355 00	49	62 00
District 2.....	25	505 00	58	685 81
District 3.....	40	380 00	26	141 50
Manitoba—				
District 1.....	1	40 00	3	432 00
District 2.....	8	270 00	7	403 17
Saskatchewan.....	20	180 50	16	135 00
Alberta.....	27	112 50	11	128 00
British Columbia—				
District 1.....	72	862 50	23	3,122 31
District 2.....	42	1,060 00	26	3,405 50
District 3.....	20	545 00	22	356 40
Yukon Territory.....	Nil.	Nil.	Nil.	Nil.
Ontario.....	1	10	1	353 90
Total.....	391	6,770 00	304	10,101 51



FIFTY-FOURTH

ANNUAL REPORT

OF THE

FISHERIES BRANCH

Department of Marine and Fisheries

FOR THE YEAR

1920



PRINTED BY ORDER OF PARLIAMENT



OTTAWA

THOMAS MULVEY

PRINTER TO THE KING'S MOST EXCELLENT MAJESTY

1921

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Dept. of Fisheries

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SESSIONAL PAPER No. 40

A. 1922

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*To His Excellency the Duke of Devonshire, K.G., P.C., G.C.M.G., G.C.V.O., etc.,  
etc., Governor General and Commander in Chief of the Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-fourth annual report of the Fisheries Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

C. C. BALLANTYNE,

*Minister of Marine and Fisheries.*

DEPARTMENT OF MARINE AND FISHERIES,

OTTAWA, May, 1921.



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## DEPUTY MINISTER'S REPORT

To the Hon. C. C. BALLANTYNE,  
Minister of Marine and Fisheries.

SIR,—After a separation of six years, the Fisheries Branch was again attached to this department, and I have now the honour to submit the fifty-fourth annual report thereof. By Order in Council of the 16th of June, 1914, the Fisheries Branch was transferred from the administration of this department to that of the Naval Service, such transfer to take effect on July 1, 1914. At that time the work of that department was comparatively light, but owing to conditions that were brought about by the war, it was considered that the duties thereof will in future require the full attention of the deputy minister; also experience showed that there is really nothing in common in the duties of the Department of the Naval Service and the Fisheries Branch. On the other hand, as the shipbuilding programme of this department would soon be completed, it was found feasible for the undersigned to assume, under your direction, the responsibility for the administration of the Fisheries Branch. Hence by Order in Council of May 29, 1920, the administration of that branch was retransferred to this department to date from July 1 last, or, as above stated, after a separation of exactly six years.

It is also of importance to note that by the terms of the Order in Council retransferring the branch the title of the chief administrative officer thereof was raised from that of "General Superintendent of Fisheries" to that of "Assistant Deputy Minister of Fisheries."

This report deals with:—

- Investigations into fish curing methods.
- Utilization of fish offal.
- Reorganized service.
- Change of policy in British Columbia.
- Publicity, transportation and marketing.
- Scouting for mackerel.
- Jurisdiction over the fisheries.
- International questions.
- Investigations into the natural history of the lobster.
- Fishways.
- Inspection of fish.
- Cannery inspection.
- Fisheries statistics.
- Fishing bounty.
- Fish culture.
- Oyster culture.
- Biological stations of Canada.
- Review of the fisheries of 1920.

Appendices to the report include the following:—

1. Reports of Chief Inspectors of Fisheries.
2. Entries in Canadian Ports by United States Fishing Vessels.
3. Report of Fisheries Engineer.
4. Fisheries Expenditure and Revenue.
5. Summary of Licenses issued.

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## INVESTIGATIONS INTO FISH CURING METHODS

While the curing of fish by salting has been going on for centuries there has been a most surprising lack of exactness in the operations, and a want of knowledge as to the causes of certain results. For instance the "reddening" particularly of codfish is an old difficulty from which cause serious losses have been experienced; but all the causes and how they can be avoided are not known. Investigations have shown that bacterial action is an important cause and that certain salts especially such as are obtained from sea water contain impurities that may include such bacteria. Also exact data is needed as to the rates of penetration of different kinds of salt at different temperatures, the strength of brine required for fish of different sizes and at different temperatures, the length of time fish should remain in brine, etc.

There is also need for investigation into methods of smoking fish. Neither in this country nor in any other has there been the improvement in methods, keeping in view the importance and extent of this industry, that is observed in practically all other lines of industry. There is a remarkable absence of data as to the temperatures that should obtain. Also mechanical appliances to reduce the handling of fish during smoking, etc., to a minimum, and thus lower costs of production, have not yet been introduced to any marked extent. This is obviously a matter for the consideration of a mechanical engineer rather than of a chemical expert.

Some investigations into the smoking of fish were conducted by the Biological Board some years ago, but these were not followed to a conclusion.

## UTILIZATION OF FISH OFFAL

The conversion of fish offal into commercial products—meal for feeding animals, fish scrap for fertilizer and oils of different grades—has long since passed beyond the experimental state. Where large quantities of offal can be obtained at given centres cheaply, a successful commercial business in converting it into such products is perfectly feasible, and is now being engaged in quite extensively in different places in Canada.

We have, however, an enormous quantity of offal being produced along our shores which is going to waste on account of no sufficiently economical method of using it being known.

Arrangements were made early in the year whereby these matters were taken up by the Biological Board in conjunction with the Research Council, which latter appropriated seven thousand dollars for fish curing investigations. Good progress has been made and two interesting reports are now about ready for publication.

## REORGANIZED SERVICE

The reorganization of the outside service along the lines explained in last year's report has been well advanced. It has been completed in our Eastern Fisheries Division, which comprises the Maritime Provinces, and it is nearing completion in the Prairie Division. It had previously been effected in British Columbia.

The service has already been placed on a much more effective and efficient basis than the previous one. Underpaid part-time officers have been replaced by an intelligent group of young active men, who are devoting their whole time and thought to their duties. This is not only resulting in a determination on the part of each officer to have his district as nearly as possible above reproach from the standpoint of observance of the fishery laws, as these young men are already becoming enthusiastic about the possibilities of the fishing industry, as well as in the natural history of the various fishes. There seems every reason for confidence that in a few years these officers will not only be law enforcers, but they will be able to be generally helpful to those engaging

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in the industry. To fit them to be such, a kind of summer school has been started. In September last all the officers in the Eastern Division were gathered at Truro, N.S., when they received a preliminary course of instructions. The Assistant Deputy Minister of Fisheries and the chief inspector for the division dealt with administrative topics. The Commissioner of Fisheries and Doctor A. G. Huntsman, of the Biological Board, gave a course of instructions in connection with fish life, and Mr. Robert Gray, Inspector of Fish Curing and Packing, dealt with the question of proper barrelmaking and packing pickled fish. These instructions occupied one week.

It is not intended to urge that a great deal of direct teaching could be done in that time; but the important point is that a start in what is a new movement has been made. The time was long enough to enable the officers to get the vision of what usefulness their positions can be made, if they do their full part in fitting themselves to properly carry through the possibilities involved.

It is intended to make this course of instructions an annual matter. To carry it out to the best advantage, it may be found desirable to call the officers together in units at suitable centres rather than as a whole. The greatest difficulty is to find a time when the officers can be spared from their districts for a considerable period and when those competent to give the needed instructions are able to arrange to do so.

## CHANGE OF POLICY IN BRITISH COLUMBIA

The policy of protecting the salmon fisheries of British Columbia by means of limiting the number of persons that might engage in the fisheries and the number of canneries that might operate, together with usual regulations, which method of administration had been effective at least since 1908, was changed at the end of last year to an "open-door" policy. The department had felt for years past that the "open-door" policy was the proper one; but it was so strongly contended by those engaging in the canning industry that such a policy would speedily result in depletion of the fisheries that it was not previously found feasible to make the change. Obviously the difficulties of properly protecting fisheries such as the salmon fisheries, over the coastline of some seven thousand miles in extent, and most of which is more or less remote, are exceedingly great, and these are minimized if undue competition is prevented. The department, however, felt assured that even with the "open-door" policy the task of adequately protecting the different runs of salmon would not be an impossible one for it, and the experience of the past year has shown beyond dispute that it can do this. During the past season the Assistant Deputy Minister of Fisheries, accompanied by the Chief Inspector of Fisheries for the province went over the whole coast. He found the protection of the fisheries to be thoroughly in hand in every portion of the division, and that the organization was so complete that violations of the law could not go on to any important extent. It was also apparent on all hands that the change in policy was giving general satisfaction. The cannery managers without exception favoured it and the agitation amongst those desiring to engage in the industry, but who previously had been prevented from doing so, had disappeared.

The wisdom of the change is unquestionable and there seems little room for doubt that in the course of a year or two a request for reversion to the old policy would find no support amongst those engaging in the industry.

## NEW DIVISION OF PUBLICITY, TRANSPORTATION AND MARKETING

The Publicity, Transportation and Marketing Division completed the first year of its organization on December 15 last. During the fifteen and a half months of its existence—up to the close of the fiscal year, March 31, 1921—this division has developed satisfactorily and in its various ramifications has proved of marked value to those commercially engaged in the fishing industry. The work of the three subdivisions is hereinafter discussed.

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*Publicity.*—The fact was early appreciated that our Canadian citizens and people of foreign countries required information as to the extent and importance of our fishing industry and enlightenment as to the comparative food value of fish and the economy of a diet with fish judiciously incorporated. At the production end of the industry propaganda is also required to impress upon fishermen, packers, etc., that certain standards must be maintained to satisfy consumers at home and abroad.

Since July, 1920, a Press Bulletin has been published monthly and distributed to newspapers throughout the country for the purpose of keeping Canadians advised regarding conditions, etc., in the industry. In addition, special illustrated articles have been supplied to different publications. Upon the occasion of National Fish Day the division exerted special energy to keep the newspapers posted and a series of special articles were sent out, together with appeals over your signature.

For some time there has been a want of literature in the form of pamphlets for the information of the layman and arrangements have been made for the publication of a series of these. Already two have been received from the printer—"Canada's Fishing Industry" and "Fish and Chip Shops"—and they are being distributed to advantage.

During the year competitions were in progress among school pupils throughout the Dominion and also among students in household economy. The prize winners in these competitions have not yet been announced.

Educational propaganda among the fishermen included a campaign to induce them to desist from using a fork in handling fish. A large display card pointing out by illustration and otherwise the evil results of such a practice was posted conspicuously at points where fishermen operate.

During the summer of 1920 photographers were engaged to take moving pictures and still photographs of various phases of the fishing industry in the maritime provinces. As a result of their work about 190 excellent still pictures and approximately 5,000 feet of film have been added to the department's collection. The moving pictures are already in circulation throughout the Dominion and later will be sent to foreign countries. Many of the still photographs are being put on lantern slides and will be circulated broadcast with appropriate lectures.

The retail trade has been urged to give more attention to advertising. Repeated efforts have been made to impress upon them the vital part which consistent advertising plays in the system of business.

*Transportation.*—Improved transportation is one of the vital necessities of the industry in Canada. During the past year many individual complaints have been received about inefficient freight and express service and discriminate rates. These complaints have come from the Pacific coast, the Atlantic coast and the district surrounding the Great Lakes. In the majority of cases satisfactory adjustments have been made and some cases are still pending.

In addition, efforts were made to improve the fast freight service from the Atlantic coast to Montreal and Toronto. The prevailing express rates and unsatisfactory service in many instances, have converted many to the idea that the satisfactory provisioning of these markets must depend upon regular fast freight service. As a result of a recent conference with Canadian National Railway and Grand Trunk officials, assurance has been received that the Canadian National Railway fast freight from Halifax and Mulgrave will adhere to schedule—that is, sixty-four hours and fifteen minutes from Halifax and approximately seventy-two hours from Mulgrave. Grand Trunk officials have furthermore given assurance that shipments for Toronto will be promptly picked up and made available for delivery in Toronto within thirty-six hours after leaving Montreal.

*Marketing.*—Concerning the marketing of fish in Canada there are many matters to be considered. The per capita consumption is not more than twenty pounds per

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annum, which is exceedingly low considering Canada's position in the fish-producing world. It is doubtful if any fish-producing country of importance has a smaller per capita consumption. It is quite obvious, however, that people will not buy fish in large quantities at high prices. While the amounts paid the fishermen have declined in recent months to almost a pre-war level, there has not been a corresponding drop in the retail prices. The reason for this, apparently, is the increased cost of transportation, labour and general operations which have shown little or no inclination toward lower levels. It appears that there is room for improvement in the matter of retail prices, but the most effective way of bringing this about is to stimulate trade and to encourage consumers to vary their fish diet in order that a greater percentage of the fisherman's catch may be utilized.

*Foreign trade.*—During 1920 a comprehensive survey was made of the markets of the world in regard to fish requirements and the possibility of Canadian packers and exporters successfully meeting competition.

Canadian exporters have been advised from time to time by circular letter as to the possibility of extending trade. Recently such circulars have covered the Argentine Republic, Brazil, West Indies, Australia, India, and China. The fact that practical use has been made of the information thus furnished is proved by letters which have been received from exporters. There has also been furnished to interested parties the names of fish importers in foreign countries, as well as other information which will tend toward the development of foreign trade.

## SCOUTING FOR MACKEREL

Arrangements were made last spring with the Department of the Naval Service to have the Fisheries Protection cruisers, detailed to follow the movements of the United States mackerel purse-seiners, endeavour to keep just in advance of the schools of mackerel and at least daily to send wireless reports to shore giving the locations of the schools of mackerel when observed, their apparent volume and the direction in which they were moving. There was a double object in this arrangement. First it was felt that a good purpose would be served by keeping the fishermen all along the coast who were interested in the mackerel fishery advised as fully as possible as to the movement and volume of the schools of fish, and in the second place information would be gained which would be of value to those studying the natural history of the mackerel.

The daily information sent by wireless from the cruisers was repeated by telegram to all points along the Atlantic coast to the fishermen who would be interested. The cost of these land telegrams was the only extra expense that was involved in the arrangement.

Cruising began off Cape Sable on the 8th of May, and the first school of mackerel was observed on the eleventh of that month forty miles east of Seal island. This school was apparently approaching from the south and was working its way north and northeast. It was then on the west edge of Brown's bank. On the 16th of May a large body of mackerel was observed thirty miles east of Cape Sable. This school apparently followed along the southern edge of Brown's bank, a portion of it moving up the deep water channel on the western edge of the bank while the remainder followed the deep water on the eastern edge of that bank.

On the 17th of May another large body of fish was observed moving slowly northward. It was coming from the south and was between Brown's bank and LeHave bank. It converged with the school previously mentioned. The fish were next sighted on the 20th of May west of Roseway bank, where the school divided, a portion going north of Roseway bank and the main body going east between Roseway and LeHave banks.

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The cruising was continued until the fish had passed the southeastern portion of Nova Scotia.

It is hoped that it will be found feasible to continue these observations in coming years so that the fullest information possible may be available as to the movements of the mackerel.

#### JURISDICTION OVER THE FISHERIES

The question of extending the jurisdiction of the Federal Government over the fisheries in all parts of Canada has finally been settled. This was done by the decision of the Judicial Committee of the Privy Council in the Fisheries Reference that was agreed to with the province of Quebec in 1915. As will later be shown this reference was considered by the Court of King's Bench in 1917, but owing to the conditions brought about by the war, it was not found possible to have it argued before the Judicial Committee until this year. The decision of the committee was given on November 30, 1920.

The decision finds in substance that there is a public right of fishery, over which the Federal authorities have exclusive jurisdiction, not only in the navigable tidal waters but in the non-tidal portions of the streams that are navigable as well, thus including valuable salmon and other fisheries.

The history of this question is concisely as follows:—

At the time of Confederation it was understood that by the provisions of the British North America Act, the complete jurisdiction of the fisheries in the different provinces was transferred to the Federal Government. A few years afterwards question arose as to whether this was the case. In 1882 a decision of the Supreme Court of Canada was obtained in the case known as "Queen vs. Robertson," which determined that the ownership of the fisheries in the non-tidal waters still remained vested in the provinces or in the riparian owners. This did not apply to what are now the Prairie Provinces and the territories north thereof, as the Crown Lands therein were owned by the Federal Government. Following this decision the provinces continued to press a claim to greater jurisdiction, and a reference in the premises was finally submitted to the Privy Council, the decision of which was given in 1898. This decision was in substance, except in those waters which at the Union passed to the Dominion under the third schedule of the British North America Act, 1867, that whatever proprietary rights in the fisheries were vested in the provinces at the time of Confederation remained their property subsequent thereto; but the exclusive power to regulate the fisheries, wherever they might be situated, is vested in the Federal Government. Immediately following this decision the different sea-washed provinces claimed jurisdiction over the tidal fisheries, not only in the rivers and estuaries, but in the bays and territorial waters along the seacoast as well. The Federal Government, on the other hand, maintained that there is a public right of fishery in tidal waters, and that, as such, it came within the exclusive purview of the Federal Government.

For years negotiations went on with the different provinces to settle the matter amicably; but this was not found to be possible, and finally in 1913 a reference to the courts was decided upon with British Columbia, in which the other provinces interested became intervenants. The decision in that case maintained the contention of the Federal authorities.

This settled the question in all sea-washed provinces, with the exception of Quebec, which contended that as the decision was largely based on Magna Charta, and that as Magna Charta did not apply to the province of Quebec, the decision did not affect the situation in that province.

In order to settle the matter speedily, it was finally agreed that a reference should be submitted to the Court of King's Bench in Quebec, under authority of a provincial

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statute which was obtained for that purpose. The decision in that court was adverse to the Federal contention, but as above explained this decision was reversed by that of the Judicial Committee.

The Federal fishery regulations have been amended to place them in line with the law, as laid down by the Privy Council decision, so that during the approaching fishing season, the fisheries in the navigable tidal waters, as well as in the non-tidal portions of the streams in Quebec that are navigable and accessible by way of navigation from the sea, will be administered by this department, and no fishing in such waters will be allowed, excepting under license from the minister thereof.

## INTERNATIONAL QUESTIONS

While the International Commission, that was appointed in 1918 to consider a settlement of outstanding questions between Canada and the United States, submitted a unanimous report to the respective Governments when they completed their work, it was not made public during the earlier stages of the negotiations following its submission. It was, however, published by both Governments concurrently on July 26 last, since which date copies of it have been available to those interested.

*Fraser River Treaty.*—Amongst the questions submitted to the commission for consideration was that of the rehabilitation and protection of the salmon fisheries of the Fraser River system, which include not only those of the estuary of the Fraser river and gulf of Georgia, but those of the northern portion of Puget sound and of the strait of Juan de Fuca as well. The commission recommended that a treaty be entered into between the two countries for the joint protection of this system of salmon fisheries, and to that end it submitted a draft of a proposed treaty and regulations thereunder. This draft treaty and regulations, with slight modifications not involving any change in intention of the treaty regulations, was approved by the two Governments and was signed at Washington on September 2, 1919. On the following day it was submitted by the President of the United States to the Senate thereof for ratification but when it came up for consideration in the Senate, objection arose to the wording of the last sentence of the second article, on the ground that under the wording thereof a person who was tried in one country for a violation of the regulations and was acquitted might be tried for the same offence, if he visited the other country, as he would not have been "punished for such offence" in the other country. Consequently on the 15th of January, the President requested the Senate to have the treaty returned to him for further consideration. This was done and on the 25th of May, 1920, an amended treaty was signed at Washington, which treaty was submitted by the President of the United States Senate for ratification on the 29th of that month, but action on it has not yet been taken by the Senate. Meantime effective measures for the building up of these fisheries are being delayed. This is exceedingly unfortunate. The existing position is aptly and concisely put in the following extract from the report of the Commission:—

The fact that these fish pass through the waters of the two countries makes it impossible to properly protect them by independent action. The fishermen of either side are inclined to operate to the limit when the fish are in their waters and place the responsibility for untoward results on those of the other country.

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How the fishery has declined, will be realized from the following statement of the packs of sockeye salmon for a series of years:—

YEAR.	FRASER RIVER PUGET SOUND TOTAL		
	No. Cases.	No. Cases.	No. Cases.
1902.....	293,477	372,301	665,778
1903.....	204,809	167,211	372,020
1904.....	72,688	109,264	181,952
1905.....	837,489	825,453	1,662,942
1906.....	183,007	178,748	361,755
1907.....	59,815	93,122	152,937
1908.....	63,126	170,951	234,077
1909.....	542,248	1,097,904	1,640,152
1910.....	133,045	248,014	381,059
1911.....	58,487	127,761	186,248
1912.....	108,784	184,680	293,464
1913.....	684,596	1,673,099	2,357,695
1914.....	185,483	335,230	520,713
1915.....	89,040	64,584	153,624
1916.....	27,394	84,637	112,031
1917.....	123,614	411,538	535,152
*1918.....	16,849	50,723	67,572
*1919.....	29,628	64,346	93,974
*1920.....	44,598	62,654	107,252

\*Added.

Two facts are outstanding:—

1. The yearly possibilities of the Fraser river must be measured by the conditions of the "big years." All that is needed to produce the run of a "big year" any season is to have the spawning beds of the whole system seeded as plenteously in the "big years" of the past. The river is as free from pollution or artificial obstruction as it ever was, and all the conditions for successful spawning are as favourable as in early times. The only deficiency is in the spawning fish.

2. Unless drastic action is taken, internationally, to save the situation, the fishery will become commercially exhausted in a few years. The figures for 1918 clearly evidence this.

It would be an international calamity, involving almost criminal neglect, on the part of both countries if the latter condition were allowed to obtain. On the basis of the present prices, the sockeye progeny of this river should be producing, annually, a food worth over \$30,000,000, this figure being based on the actual pack of the last "big year," 1913. As it is, the average value for the four years ending 1918 is about three million dollars.

Canada has left nothing undone that she could do to remedy this unfortunate condition.

*Port Privileges Treaty.*—No substantial progress has been made since the last annual report in the negotiations for a final settlement of the questions affecting privileges in the ports of either country to the fishing vessels of the other. Meantime the temporary arrangement for reciprocal privileges, which was made shortly after the Commission began its work, and at its instance, is being continued in both countries.

*Pelagic Sealing Treaty.*—The good effects of this treaty are becoming increasingly evident as the years go by. The condition of constantly diminishing herds, which at the time the treaty was entered into had reached dangerously near the point of commercial exhaustion, has been replaced by one of ever increasing herds.

The herds in which Canada is interested under the treaty are those resorting to the Pribilof islands, Behring sea, which are part of Alaska, the Commander islands, also in Behring sea, but which belong to Russia, and Robben island in the North Pacific ocean, which since the Russo-Japanese war has belonged to Japan. By far the largest herds are those resorting to the Pribilof islands.

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The following statement shows the number of seals taken on the different rookeries and the revenue derived therefrom by Canada since the treaty became effective in 1912:—

Country.	Year.	Total No. of Seals Taken.	Canada's Share.	No. Sold.	Value of Canada's Share.	Total.	Net Total.
					\$ cts.	\$ cts.	\$ cts.
<i>United States—</i>							
Advances with interest provided for by treaty.....	1912	(a) 2,427	1,000	2,427	34,672 13	258,157 36	258,157 36
	1917	1,943	1,000	1,943	55,900 00		
	1918	34,890	5,234				
	1919	27,821	4,173	(b) 13,332	137,710 41		
	1920	(c) 26,648	3,997	14,840	215,622 89	443,905 43	185,748 07
							443,905 43
Exchange.....							24,560 59
							468,466 02
Skins still unsold (Jan. 31, 1921).....		61,187	9,178				
<i>Russia.....</i>							
	1917	806	121	121	3,051 40	3,051 40	3,051 40
	1918	none.					
	1919	636	96	Not yet sold			
	1920	no report.					
<i>Japan.....</i>							
	1912	139	14	123			
	1913	547	55	sold in 1917.	2,620 36		
	1914	537	54				
	1915	571	58	sold in 1918.	962 31		
	1916	none.					
	1917	none.					
	1918	550	55	Not yet sold			
	1919	555	56	"			
	1920	555	56	"		3,582 67	3,582 67
Cash received to date, Jan. 31, 1921.....							475,100 09

*Unsold Skins—*

From United States.....	9,178
From Russia.....	96
From Japan.....	167
Total.....	9,441

(a) 3,764 were shown in last year's report; but 1,337 of these were taken in 1911.

(b) This is the number taken up to Nov. 30th, 1920. It is possible that it may be increased slightly by skins that may have been taken in December, and which have not yet been reported.

(c) The total number sold in that year was 15,275; but 1,943 of these were taken in 1917, but as Canada, in accordance with the terms of the Treaty was paid on the basis of 1,000 skins as her share that year, these are not included in the number shown as sold.

The prices for dressed and dyed seal skins reached their high water mark at the sales held in St. Louis, Mo., in February, 1920. At these sales 9,100 skins were sold, which brought an average net price of \$121.53. At the sales in May, 1920, 5,740 skins were sold. They brought an average net price of \$57.84, or a drop of 52 per cent.

It seems quite probable that there will be a further serious decline in prices so that the financial returns in the future will doubtless be proportionately less than they have been to date.

*International Arrangement for Deep Sea Fisheries Investigations.*—The question of international co-operation in deep sea fisheries investigations was under consideration before the war, but had to be deferred on account of it.

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In Europe most of the maritime countries about twenty years ago arranged for co-operation in such work and to that end they formed an association known as the International Council for the Exploration of the Sea. Permanent headquarters for this council are maintained at Copenhagen.

While Canada was urged to become a member of this council, and so contribute to the cost of its maintenance, it was felt that our problems could best be solved by direct investigation on this side of the ocean; and it was feared that there was not much likelihood that such investigation here could be expected at least for many years by the council.

As such work on this side is of common interest on the Atlantic coast to Newfoundland, the United States and Canada, and on the Pacific coast to the United States and Canada, it is obviously desirable that there should be co-operation between these three Governments in carrying it out. To this end an informal conference of fisheries experts representing the Governments of the three countries was convened at Ottawa in September last, when the following resolution was unanimously adopted:—

*Be it Resolved That*,—It is the sense of this meeting that, on the nomination of the fishery services of the countries represented, each of the respective Governments should forthwith designate three persons to constitute an International committee on marine fishery investigations, this committee to determine what measure of International co-operation is desirable, what general investigations should be undertaken, consider definite problems that may be awaiting study, submit recommendations to their respective Governments, and co-ordinate and correlate the results of the work.

It is the expectation that the respective Governments will undertake to provide the necessary ways and means for conducting such independent and co-operative investigations as may be adjudged desirable by the International committee.

It is recommended that the International committee establish contact with the Permanent International Council for the Exploration of the Sea.

This resolution was subsequently approved by the three Governments. Under its provisions it will be possible to guard against unnecessary duplication of effort in the different countries and to arrange for complimentary work along certain lines, so as to assure the maximum of information to be obtained with a minimum of expenditure and in a minimum time, and without the necessity of maintaining any expensive separate organization.

The Canadian representatives on this committee are:—

Wm. A. Found, Assistant Deputy Minister of Fisheries.

Dr. A. G. Huntsman, of the Canadian Biological Board.

Mr. Loring C. Christie, LL.B., Legal Advisor of the Department of External Affairs.

The United States representatives are:—

Dr. H. F. Moore, Deputy Commissioner of the United States Bureau of Fisheries.

Dr. Robt. E. Coker, Chief of the Division of Scientific Inquiry, in the Bureau of Fisheries.

Dr. Henry B. Bigelow, Consulting Oceanographer of the Bureau of Fisheries.

Up to the moment the names of the representatives of the Government of Newfoundland have not been received; but with as little delay as possible thereafter a meeting of the committee will be held to arrange the work to be undertaken during the approaching fiscal year.

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## INVESTIGATIONS INTO THE NATURAL HISTORY OF THE LOBSTER

Since the summer of 1914 inclusive, Dr. A. P. Knight, then of Queen's University, a member of the Marine Biological Board—he is now the chairman of that board—has spent his summers in investigating the life-history of the lobster. These investigations have been of such eminent interest and value that a summary thereof is now desirable.

*Lobster rearing.*—During the summer of 1914, Dr. Knight began a series of experiments to ascertain whether lobster fry could be fed and kept alive for four or five weeks after leaving the egg. Lobster hatcheries had been in yearly operations in Canada since 1891; but rearing the fry until they had become lobsterlings, that is until they were ready to sink to the bottom and adopt the life of the adult—had never been tried. This method of propagation had been in operation at Wickford, Rhode Island, from 1905 onward, and the claim was made that it was successful; hence, the demand that it should be tried out in Canada.

The method consisted in placing berried lobsters in floating boxes let down into the sea water. The boxes were ten feet long by ten feet wide by four feet deep, and had openings in the four sides, which were covered by copper wire screens. Paddles were made to revolve in each box and so cause fresh sea water to be drawn into the boxes, and the stale water forced out; thus ventilation was provided for. The fry were fed upon scrambled eggs every two hours day and night during the four weeks they were kept in confinement. They were then placed in the sea with the expectation that many more of them would grow to maturity than would be the case with newly hatched fry.

The site chosen for the repetition of the Wickford experiment in Canada was a sea pond of about five acres, which lay immediately beside the northwest end of St. Mary's bay, Digby County, N.S.

After repeated trials which extended over two summers in this location, the method was abandoned as a failure. Not a single fry had reached the third stage, though a few hundred had lived for seventeen days. The immediate cause of death was in most cases the accumulation of a large number of diatoms (microscopic plants) about the mouth parts, so that the animal was unable to eat. It is almost certain, however, that the true cause of death was the low temperature of the water. In Rhode Island waters, the temperature varied from 68° F. to 72° F.; at the west end of St. Mary's bay from 50° F. in June to a maximum of 60° F. in August.

For the next two summers the apparatus was used near Pictou on Northumberland strait. Here there was no difficulty in rearing 4 per cent of the fry until the lobsterling stage, the temperature varying around 68° F. The cost however, was out of all proportion to the number of fry that could be obtained, and hence the attempt to propagate the lobster by this method was abandoned altogether.

*Lobster Mating.*—While the experiments in St. Mary's bay turned out to be a failure, there grew out of them a discovery that may yet be of great importance in lobster propagation. Dr. Knight's discovery was that if mature male and female lobsters be confined in compartments during the breeding season, many more of the females will become egg bearers than is the case when they roam at large in the sea. This discovery was a matter of accident, and was rendered possible by the facilities afforded by the pound which the department had erected in the Long Beach pond for the retention of egg-bearing lobsters during the legal fishing season for liberation when such season had ended. The discovery came about in this way. Up to 1914 the prevalent opinion among lobster experts was that females which bore eggs, say in the summer of 1914, would not again produce eggs until the summer of 1916. They would cast their shells in the summer of 1915 but bear no eggs.

To test the accuracy of this opinion 47 females and 15 males were placed in a latticed pen in the pond. The pen was only twenty feet long by ten feet wide. This was about the middle of June. On August 12, the whole 62 were dipped up to see

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what condition they were in. Much to the surprise of everyone, 36 per cent of the females carried eggs. The surprise was not lessened when it was discovered that by the end of September the percentage had increased to 64: that is 30 of the 47 females carried eggs. The 17 which had not extruded eggs were the smaller ones.

Careful inquiries amongst nearly all the lobster fishermen at the west end of St. Mary's bay, and on the south shore of the Bay of Fundy elicited the fact that not over one per cent of the females which were caught in lobster traps ever carried eggs.

However, the Biological Board realized that inquiries amongst fishermen and mere speculation were not going to settle the question of the percentage of berried lobsters occurring naturally in the seed. Accordingly at the request of the board, the department sent out its naturalist, Mr. Andrew Halkett, for part of each of the summers of 1916 to 1920 inclusive, with instructions to accompany lobster fishermen in their boats, and ascertain exactly what percentage of berried female lobsters were caught in traps. He visited hundreds of places along the coast of the Maritime Provinces and found that the percentage varied from zero as a minimum in some places to a maximum of 14 per cent at Pugwash, N.S. The average for the whole coast varied between four and five per cent.

Concurrently with these determinations of the percentages of berried females occurring among the lobster population of the sea, experiments were continued in St. Mary's bay, at Pictou, N.S., and at St. Andrew's, N.B., as to the results of confining male and female lobsters in latticed pens during the breeding season of 1915. In all three cases, the general results were the same—there was a marked increase of berried females, for example the percentage in the mating pens in St. Mary's bay was 25; at St. Andrew's, 36; and at Pictou, 66. In 1916 mating experiments at the same three places showed an average of 40 per cent of berried females as compared with an average of 4 per cent in the sea immediately alongside of the mating pens. At Bay View the percentage was 66.

In 1917 the St. Mary's Bay pond was selected as the place in which mating could be put to its severest test. The pond is unsuitable for the purpose. Sulphuretted hydrogen (gas) exudes from the soft slimy bottom during the whole summer and algae growths soon accumulate upon the animals. Notwithstanding these drawbacks, it turned out that out of 1,000 females placed in the pond, 40 extruded eggs. How does this compare with the percentage of egg bearers in St. Mary's bay? Fishermen's traps showed a percentage of 1.22. That is, mating in lobster pens in the sea pond showed an increase of 330 per cent over the percentage naturally occurring in St. Mary's bay.

In 1918 mating experiments were continued in what is usually considered two of the most favourable localities in Northumberland strait, viz., at Tormentine and cape Traverse. At Tormentine out of 21 females which were mated with 21 males, 12 extruded eggs, or 57 per cent. At cape Traverse 24 females were mated with 24 males, and 12 extruded eggs, or 50 per cent.

To sum up then, during the five summers that mating experiments were carried on in latticed pens, the results show a very great increase of egg bearers over the numbers found to occur naturally at sea. What is the explanation? It would appear to be this. Mating in the sea at the present time would seem to be largely a matter of accident. It is said that the male does not seek out and immediately recognize a female. He, therefore, like the male crab, "tries" every lobster he meets—male and female alike. If a female does not chance to meet a male, her eggs are extruded just the same, but being unfertilized they "go bad" and of course produce no larvae. The fewer lobsters there are and the wider range over which they are distributed, the less the chances for mating and the fewer the numbers of berried females. In fact the same law operates in the sea as on the land. As the forest becomes cut down the wild animals which inhabit it become more and more scattered, and the production of young is decreased. Notwithstanding the indirect advantage that would

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result to the lobster industry if mating were systematically carried on by fishermen in areas that are especially suitable for lobster production, it is nevertheless true that neither fishermen nor canners have shown any disposition to put mating into practice. This is not to be wondered at. Hitherto nature has furnished immense numbers of animals without labour and without cost and as long as the natural supply keeps up men will catch all they can, until the numbers dwindle and fishing becomes unprofitable, or at any rate less profitable than fishing for other species. Should that point ever be reached in the lobster fishery, then the fishermen will no doubt turn to the mating of lobsters and co-operate with the Department in other practical forms of restoration and conservation. But that time has not yet come and with the close protection the fishery is now receiving, which has been made possible by the reorganized service, and with the evident good results in the way of the preservation of the berried lobster by the fishermen themselves, following the educational campaign carried on amongst the fishermen and canners, there is excellent reason to believe that such time will never come. Not only has the decline in the number of lobsters been permanently arrested, but a building-up process has been begun.

*Educational Campaign.*—The beneficial results that followed the educational campaign that was carried on amongst the lobster canners and fishermen in 1918 and again in 1919 were explained in the last annual report. These campaigns were followed during the winter of 1920 by a series of illustrated addresses by the department's naturalist, Mr. Andrew Halkett, in western Nova Scotia. Much interest was manifested by the fishermen in these addresses and helpful discussions followed them. Similar work is being carried on by him in Prince Edward Island during the present winter.

It is hoped that by such methods not only will the fisherman's knowledge of the natural history of the lobster be much enlarged but that his active sympathy and co-operation will be secured in affording the fishery the protection it must have if it is to be built up to a maximum of productivity.

*Observations on the Scallop at Mahone Bay, N.S., and Digby Basin, N.S.*—Mr. Andrew Halkett, naturalist of the department, continued his observations on the scallop at Mahone bay. These were similar to those made in the preceding year and published in the report for that year.

The observations at Digby basin led to the conclusion that important scallop beds exist therein.

## FISHWAYS

For many years one of the most difficult problems with which the department has had to deal in the protection of our anadromous fishes, and particularly salmon, shad and gaspereau, in our Atlantic rivers, has been the damming of such rivers for power purposes. This problem is beginning to be experienced to some extent in British Columbia, and it will no doubt grow there. With the increasing demand for water power the problem is becoming greater, as larger and higher dams are being built. Not only are these higher dams more difficult to equip with fishways that ascending fish will readily take, but as soon as the time of high water is over they frequently require the full flow of the stream for their power wheels, thus leaving the fishway and sometimes a stretch of the river bed below it so nearly high and dry as to be useless for the purpose intended.

The owners of dams built across important streams have for years been required to equip them with fishways. While these fishways seemed to afford a ready and easy means of ascent for fish, as a general thing it was found that fish were using them to a very limited extent. Hence the fish were being largely prevented from reaching their natural spawning grounds.

During the past three years the department has been having its fisheries engineer devote special attention to the fishway problem. The results are highly promising.

A report by the engineer dealing fully with the work done in this connection during the year is appended hereto.

#### INSPECTION OF FISH

During the season of 1920 the inspection of pickled fish and barrels was carried on as in the preceding year under authority of the Act of 1914. There were employed one inspector in Nova Scotia, one in New Brunswick, and one during the winter herring season in British Columbia. Owing to the unsatisfactory condition of the markets for all cured fish, and the high price of barrels and salt, the pack of pickled fish in 1920 was much below normal. Inspection was, of course, optional, and while the number of packers who took advantage of it in the past season was greater than in the preceding one, the number of barrels submitted for inspection was slightly less. The following table shows the number of packers who presented their fish for inspection, and the number of barrels inspected annually since the inspection was made available:—

Year.	Packers	Barrels inspected
1915.. . . . .	16	1,320
1916.. . . . .	73	7,213
1917.. . . . .	80	8,977
1918.. . . . .	110	20,664
1919.. . . . .	82	8,730
1920.. . . . .	105	8,082

While our educative and persuasive efforts under an optional inspection Act have on the whole accomplished a good deal in the way of inducing the trade to use better barrels, and to pack better fish, experience has made it clear that the means provided by such an Act were not suited for securing speedy general improvement. A system of inspection which requires inspecting officers to plead with packers to submit their product for inspection is very far from being a satisfactory one, because it makes it difficult for them to condemn the inspected product if not quite in accordance with the requirements of the Act. It was realized that so long as inspecting officers are without authority to insist on at least some of the essential points in the construction of packages, and the packing and marking of fish being complied with, the bulk of the Canadian output would continue to be marketed as poor grade stuff in inferior packages, and result in the nullification of the efforts of those packers who are endeavouring to build up a name for Canadian goods by producing a higher grade article. The department was driven to the conclusion, therefore, that the Act of 1914 required amending in order to give power to the inspecting officers to compel all coopers and packers to comply with its provisions. In this the department had the strong backing of the Canadian Fisheries Association, the Halifax Board of Trade, the Vancouver Board of Trade, the Commissioner of Fisheries for British Columbia, the now defunct Canada Food Board, and of many individual fishermen, coopers, packers and dealers.

Under the Act of 1914, when a packer desired to have his fish inspected, he notified an inspector, who visited his curing place, carried out the inspection there, and put an official stamp on such of the fish as may have been worthy of it. The experience of the past few years led to the belief, however, that that system of inspecting and branding could not be satisfactorily carried out under a compulsory standard of packing except by the employment of a very large and expensive staff of inspectors, owing to the enormous number of individual packers scattered over thousands of miles of coast line, and the greater quantity of fish that would, therefore, have to be dealt with. Consequently, the question as to what system would be

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most acceptable, effective and economical in applying the principal of compulsion was duly discussed with those directly engaged in the business, and the conclusion was reached that a system somewhat similar to that under which the inspection of fruit is carried on should be applied to the inspection of fish.

During the last session of Parliament, therefore, the Fish Inspection Act of 1914 was amended by the Fish Inspection Act of 1920, which provides authority for carrying on the inspection of fish and packages along the lines proposed. The amended Act became operative on the Pacific coast on November 1, 1920, and on the Atlantic coast on April 1, 1921. Its main purpose is to require that all pickled fish be fit for human food; that such fish be packed in water-tight barrels of a standard size; that the barrels contain the proper weight of fish, and that the fish be as represented by the marks placed upon the barrels by the packer. Fish packed by fishermen or other persons for their own use, and not intended to be sold, are exempted from the provisions of the Act.

The following is a summary of the requirements of the Act and of the regulations made thereunder:—

1. All barrels or other containers in which pickled herring, alewives, mackerel and salmon, except mild-cured salmon, are to be packed and marketed must be made in accordance with the standards defined in the new regulations, and marked by the maker with his name and address. The length and thickness of staves are to be as defined in the regulations made under the Act of 1914. In other respects the standards of requirements for barrels, with one or two minor exceptions, are similar to those defined in the old regulations.

2. All herring, alewives, mackerel and salmon, except mild-cured salmon, packed in salt and pickle in water-tight barrels or other containers, must be cured and packed in accordance with the requirements of the new regulations.

3. On the end of each barrel or container filled with either of the above-named kinds of pickled fish must be stencilled by the packer or the first dealer who repacks or reconditions the fish his name and address, the grade and the weight of the fish in the barrel or container. Pickled fish shipped by a packer to be repacked or reconditioned by the first dealer or buyer in Canada, if ungraded, may be marked "ungraded" but the containers and fish must in other respects be in accordance with the requirements.

4. Competent inspectors will visit coopers' shops and curing places for the purpose of giving instruction and advice, but the new Act does not require them to visit such for the purpose of stamping or branding the output of coopers and packers. There will be no official brand.

5. Coopers must see to it that their barrels are properly made and that their name and address is shown thereon. Packers or repackers must likewise make sure that their fish are properly packed and that the marks they place on the containers truly and correctly represent the contents.

6. At any time or place which may be found suitable or convenient, after the barrels or containers have been packed with fish, marked and made ready for market, an inspector may examine samples of the containers and fish in order to assure himself that the containers are in accordance with the standard, and that the fish are as the marks on the containers represent them to be.

7. When an inspector finds barrels or other containers, in which pickled fish are packed, not up to the standard, he will mark such barrels or containers with the words "Container below standard," and when he finds that such barrels or containers do not show the name and address of the maker, he will hold them until such name and address is ascertained. For such violations the barrel maker becomes liable to a fine not exceeding fifty dollars for a first offence.

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8. Further, when an inspector finds that the fish are not of the grade or not of the weight shown by the marks, or not of good quality, he will mark the containers with the words "Fish below grade," "Fish below weight," or "Fish below quality," as the case may be, and the packer or repacker of such fish becomes liable to a fine not exceeding fifty dollars for a first offence.

9. When an inspector finds that the barrels or other containers have no marks to show the grade and weight of fish, or if the name and address of the packer or repacker is not shown, he will seize and hold such fish until such name and address is ascertained, and the packer or repacker, in such a case, becomes liable to a fine not exceeding fifty dollars for a first offence.

10. An inspector may detain, for the time necessary, to carry out an inspection, any shipment of pickled fish if he has reasonable grounds for believing that the marks on the containers constitute a violation of the Act. In such a case he will immediately notify the packer or owner.

11. Pickled fish imported into Canada for sale must be packed in barrels similar in character and equal in quality to those required under this Act. The marks on the barrels must show the kind, grade and weight of fish and the country of origin. The name of the country of origin only is required to be shown on barrels of pickled fish imported for exportation.

12. In the event of a dispute between an inspector and the packer or owner as to quality, weight or condition of the fish or the size or condition of the containers, the packer or owner may appeal to the Minister who may order a reinspection.

In order that all fishermen, coopers and packers, who are directly concerned, might be fully informed of the Act's requirements, the forgoing summary was printed and distributed to them immediately after the passing of the Act. Complete copies of the Act and the regulations made thereunder were likewise distributed as soon as such were available.

#### CANNERY INSPECTION

Under authority of the Meat and Canned Foods Act the inspection of all fish and shell-fish canneries and of the packing operations therein, was carried on during the packing season of 1920, as in the past, by the department's outside staff of fishery officers.

This inspection has a twofold object: (a) the extension of trade, by improving the quality of the product; (b) the protection of the public, by preventing the packing of unsound fish and insisting that all cans of fish be correctly labelled.

On the Atlantic coast there were in operation 588 establishments canning lobsters, 2 canning sardines, 5 canning clams and scallops, and 22 canning other fish, such as mackerel, cod, haddock and herring; while on the Pacific coast there were 66 establishments canning salmon, 6 canning herring, pilchards, etc., and 1 canning crabs. There were in all 1,622 formal inspections made and reported on during the season, in addition to many more incidental visits of inspection.

A number of defects, such as unsatisfactory ventilation and drainage, defective coolers and utensils, were noted and corrected. In several cases licenses were withheld until the canners were made to comply with the standard of requirements. One cannery which was found to be without proper sanitary equipment for the use of the employees was made to provide such under threat of closure.

The Act, as amended November, 1919, provides definite weights of dried lobster meat for the various sizes of cans thereof, and was enforced for the first time during the past season. At the beginning of the lobster canning season in western Nova Scotia and Prince Edward Island, cans which did not contain the prescribed weight of lobster meat were found in some of the canneries. One canner was prosecuted, but the evidence showed that while some cans were under weight others were full

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weight and some even over weight. In some instances it was found on a reinspection, after some weeks, that the meat had absorbed so much of the liquid as to bring it up to the full weight. As there did not appear to be any intention on the part of this packer to defraud, the case was dismissed.

The whole matter of dealing with the packing of light-weight cans of lobster was found to be a difficult one to handle, owing to certain loopholes in the Act, which came to light during its enforcement. The action taken, however, and the activities of the fishery officers in warning lobster packers against packing light weights, have done much good, inasmuch as packers, realizing that the law was being enforced in earnest, immediately began to exercise the greatest care in seeing that the proper amount of meat was put into each can, and it seems highly probable that there will be little trouble in this respect during the season of 1921.

A great deal of trouble was experienced in the course of the past year in enforcing the labelling requirements for the various kinds of canned fish. Some which were found to be wrongly labelled were held until relabelled; a quantity of salmon found on sale in British Columbia under misleading marks were seized and confiscated; several lots of canned fish, imported for sale in Canada, found to be either wrongly labelled or without labels of any kind, were refused entry until the labelling requirements had been complied with.

It is felt, however, that most of the troubles which were met with in the past year will not recur in the coming year, as packers, taken as a whole, have been found really anxious to comply with the provisions of the Act.

## FISHERIES STATISTICS

Under an arrangement between this department and the Dominion Bureau of Statistics, the latter now compiles and publishes the annual statistics relating to the fisheries, as Part III of its Census of Industry. The information is secured partly from manufacturing establishments, on individual schedules designed to fit in with the bureau's general scheme of securing industrial statistics, and partly by the officers of this department, from those fishermen and dealers who are not classed as manufacturers, but who market their own produce. The returns from both the manufacturers and our officers are checked in this department, and afterwards handed over to the Bureau of Statistics for publication. A general review only, made up from information obtained by the department from time to time, is given in this report.

Monthly returns of the quantities and values of sea fish landed are sent to the department, as usual, by the officers in sea-fishing districts. The returns are checked and compiled to show the landings in each county and province, and in the whole of Canada. The compiled information is then summarized in a report by the department and made public through the press, monthly.

Once every three months the monthly information is compiled to show the total landings of the various kinds of fish for the quarter by provinces and for the whole of Canada. This is printed and published in the form of a Quarterly Bulletin and distributed to the trade and all directly concerned. The Quarterly also contains summaries, made up from official monthly reports of the landings of fish in the United States, England, Scotland, Ireland and of certain kinds in Norway.

## FISHING BOUNTY

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the eastern Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

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For the year 1920, payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton; payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$7.60 each.

To owners of boats measuring not less than 13 feet keel, \$1 per boat.

To boat fishermen entitled to receive bounty, \$6.10 each.

There were 9,671 bounty claims received and 9,664 paid. In the preceding year, 13,068 claims were received and 13,061 paid.

The total amount paid was \$152,519.30, allocated as follows:—

To 612 vessels and their crews, \$53,577.80.

To 9,052 boats and their crews, \$98,941.50.

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Provinces and Counties.	Number of Vessels.	Tonnage.	Average Tonnage.	Number of Men.	Amount Paid.	Number of Boats.	Number of Men.	Amount Paid.	Total Bounty Paid to Vessels and Boats, 1920.
					\$ cts.			\$ cts.	\$ cts.
<i>Nova Scotia—</i>									
Annapolis.....	1	60	60	20	212 00	115	190	1,268 90	1,480 90
Antigonish.....						121	182	1,231 20	1,231 20
Cape Breton.....	16	212	13	64	691 00	222	355	2,556 50	3,247 50
Cumberland.....	4	118	30	29	338 40	2	3	20 30	20 30
Digby.....	56	877	16	248	2,736 60	319	534	3,574 40	3,912 80
Guyssboro.....	59	891	15	249	2,764 20	619	980	6,586 80	9,323 40
Halifax.....	1	14	14	2	29 20	1,027	1,392	9,540 60	12,304 80
Hants.....	22	342	16	106	1,136 80	288	569	3,759 90	29 20
Inverness.....	1	11	11	3	33 80	43	61	415 10	4,896 70
Kings.....	144	9,295	65	2,422	27,627 60	536	651	4,514 00	448 90
Lunenburg.....						39	51	344 10	32,141 60
Pictou.....	12	231	19	62	697 40	158	249	1,683 00	344 10
Queens.....	31	561	18	156	1,726 20	355	608	4,059 80	2,380 40
Richmond.....	25	660	26	185	2,045 60	534	957	6,368 70	5,786 00
Shelburne.....	12	181	15	52	576 40	236	351	2,373 10	8,414 30
Victoria.....	21	1,151	55	348	3,775 40	88	180	1,186 00	2,949 50
Yarmouth.....	405	14,604	36	3,946	44,390 60	4,702	7,343	49,482 40	4,961 40
<i>New Brunswick—</i>									
Charlotte.....	6	90	15	23	253 60	303	499	3,344 90	93,873 00
Gloucester.....	177	2,673	15	731	8,064 60	66	135	3,889 50	3,598 50
Kent.....	7	70	10	18	206 80	57	119	782 90	8,954 10
Northumberland.....	1	21	21	4	51 40	1	3	19 30	989 70
Restigouche.....	1	11	11	1	18 60	1	1	7 10	70 70
St John.....						124	19	127 90	25 70
Westmorland.....						1	1	7 10	127 90
Total.....	192	2,865	15	767	8,595 00	441	777	5,178 70	13,773 70
<i>Prince Edward Island—</i>									
Kings.....	4	67	17	13	165 80	312	433	2,945 30	3,111 10
Prince.....	5	77	15	20	229 00	275	498	3,261 80	3,490 80
Queens.....	3	36	12	7	89 20	104	216	1,419 60	1,508 80
Total.....	12	180	15	40	484 00	691	1,147	7,626 70	8,110 70
<i>Quebec—</i>									
Bonaventure.....	1	11	11	2	26 20	216	374	2,479 50	2,505 70
Gaspé.....	1	10	10	4	39 20	2,182	3,982	26,250 20	26,289 40
Rimouski.....						50	74	501 40	501 40
Saguenay.....	1	20	20	3	42 80	770	1,121	7,422 60	7,465 40
Total.....	3	41	14	9	108 20	3,218	5,551	36,653 70	36,761 90
Grand Totals.....	612	17,690	29	4,762	53,577 80	9,052	14,818	98,941 50	152,519 30

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## FISH CULTURE

The fish cultural operations for the calendar year 1920 were restricted to the fresh water and anadromous species, and also were confined almost entirely to the more important commercial foodfishes such as, Atlantic salmon in the east, whitefish, cisco, salmon trout and pickerel in the interior, and the various varieties of salmon in the west.

The most of the commercial species were distributed as fry after the food sac was absorbed, on the natural spawning grounds, and largely where the eggs were collected. The sporting varieties such as, speckled trout in the east and cutthroat and rainbow trout in the west were hatched in limited numbers, and after adequate return was made to the areas where the eggs were collected were practically all deposited in public waters. A small percentage was allotted to privately controlled or leased areas, on payment of nominal prices and distribution expenses.

The feeding of salmon has been given greater attention during the past summer than formerly and the distribution of fingerlings was considerably increased. The use of natural ponds for this purpose was given particular consideration and the neighbourhood of practically all the salmon hatcheries was carefully inspected with the object of locating suitable places for such ponds on a large scale. Arrangements are sufficiently advanced to enable a considerable portion of the coming season's hatch of salmon to be retained and fed through their first summer, and unless something unforeseen occurs accommodation will be available at several hatcheries by next autumn to hold a large number of fry into their second summer, or to the age at which the majority migrate to sea, under natural conditions.

The conditions met with during the collection of eggs were most unfavourable in some areas, with a consequent decrease in the number of eggs obtained. The total collection of 1919 was exceeded, and a record was established in the number of whitefish eggs obtained, which was over two hundred million greater than in the previous year. Increases were also made in the collection of Atlantic salmon and cutthroat trout eggs.

The total collection of eggs of the different species was as follows:—

## COLLECTION OF EGGS DURING 1920.

Atlantic salmon.. . . .	29,080,200
Ouananiche.. . . .	60,000
Cutthroat trout.. . . .	1,061,635
Steelhead salmon.. . . .	161,900
Kamloops trout.. . . .	344,000
Sockeye salmon.. . . .	85,368,450
Spring salmon.. . . .	4,491,500
Coho salmon.. . . .	3,866,300
Chum salmon.. . . .	5,727,000
Speckled trout.. . . .	502,950
Whitefish.. . . .	789,605,000
Salmon trout.. . . .	29,403,500
Cisco.. . . .	21,380,000
Pickerel.. . . .	231,384,800
	1,202,437,235

An abundance of grilse in the Atlantic salmon rivers generally during the past autumn is a most encouraging indication of a return to normal conditions after the comparatively small runs of salmon of the past two seasons. The conditions on the spawning grounds of the British Columbia rivers during the past season were also most encouraging. All the hatcheries in the province were well filled and, in addition, the natural spawning beds were well seeded. The collection of sockeye salmon eggs alone was upwards of eighty-five million, although the climatic conditions in many districts during the egg-collecting season were very unfavourable.

A modern and fully equipped hatchery was completed on Granite creek, a tributary of Lakelse lake, which in turn flows into the Skeena river, to replace the old

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establishment on Coldwater creek, tributary to the same lake, which was put out of commission by abnormal freshets three years ago. The hatchery building is 110 feet long by 40 feet wide with an L 16 feet by 20 feet; walls 10 feet high and roof carried on ten trusses. The equipment includes one hundred and twenty hatching troughs having a total capacity of ten million eggs. A central floor drain, the full length of the hatchery, 6 feet wide and from 18 inches to 2 feet in depth, into which the water from the troughs discharges provides considerable space for fry, which will relieve the troughs during the hatching period. The other buildings include the superintendent's dwelling, which is a four-room bungalow, 25 feet 6 inches by 30 feet; living quarters for the staff, which is a two-storied seven-room building, 25 feet by 30 feet, and a boathouse with a landing stage. All the buildings are constructed with concrete foundations and the hatchery with concrete floor throughout. Both dwellings are modern, with basements, hot-air furnaces and sanitary plumbing. The construction was carried on by day labour, under the direct supervision of the Fisheries resident engineer for British Columbia.

There are now thirty-five main hatcheries, eleven subsidiary hatcheries and six salmon retaining ponds in operation, from which the total distributions of the different species in each province during the season of 1920 was as follows:—

## HATCHERY OUTPUT BY PROVINCES OF EGGS, FRY AND OLDER FISH DURING 1920.

*Nova Scotia—*

Atlantic salmon.. . . .	6,487,750	
Rainbow trout.. . . .	105,000	
Speckled trout.. . . .	165,000	
		6,757,750

*New Brunswick—*

Atlantic salmon.. . . .	10,083,444	
Rainbow trout.. . . .	12,500	
Speckled trout.. . . .	328,403	
		10,424,347

*Prince Edward Island—*

Atlantic salmon.. . . .	860,140	
Speckled trout.. . . .	124,265	
		984,405

*Quebec—*

Atlantic salmon.. . . .	2,376,581	
Speckled trout.. . . .	179,633	
		2,556,214

*Ontario—*

Spring salmon.. . . .	433,200	
Whitefish.. . . .	205,662,500	
Salmon trout.. . . .	20,401,252	
Cisco.. . . .	40,800,000	
Pickarel.. . . .	120,400,000	
		387,696,952

*Manitoba—*

Whitefish.. . . .	201,111,250	
Pickarel.. . . .	25,353,600	
		226,464,850

*Alberta—*

Rainbow trout.. . . .	607,660	
Cutthroat trout.. . . .	432,752	
Salmon trout.. . . .	174,441	
		1,214,853

*British Columbia—*

Cutthroat trout.. . . .	172,075	
Steelhead salmon.. . . .	107,454	
Kamloops trout.. . . .	238,805	
Sockeye salmon.. . . .	90,175,369	
Albino spring salmon.. . . .	4	
Spring salmon.. . . .	3,951,253	
Kennerly's salmon.. . . .	1,034,000	
Coho salmon.. . . .	2,243,403	
Pink salmon.. . . .	4,264,050	
Chum salmon.. . . .	584,000	
Speckled trout.. . . .	6	
Whitefish.. . . .	11,517,000	114,287,419
		750,386,790

Total distribution.. . . .

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As above indicated, experiments have been carried on with different kinds of food for young fish, prepared in various ways and fed in different rotations. Experiments have also been made in hatching eggs in gravel under conditions as near those of nature as possible. This method has yielded most satisfactory results in some instances, but further experiments are necessary before the method can be adopted on a larger scale. Under certain conditions, it provides an efficient means of stocking isolated waters to which fry cannot be conveyed from existing hatcheries. The stocking of lakes, barren of fish life, but containing an abundance of natural food, has proven most efficient. Sockeye fry in some instances have attained, in from seven to ten weeks, a growth equal to the average growth attained by the Fraser river sockeye in one year.

The acclimatization of the better varieties of food and sporting fish has also been achieved. The eastern speckled trout and whitefish have been established in considerable areas in British Columbia, and encouraging returns are apparent from the distribution of spring salmon in certain tributaries of lake Ontario. The introduction of bass and other fish of predatory habits into salmon and trout areas, on account of the harm that might be done to the young of these species is discouraged.

Investigation of the spring and autumn runs and the possibility of these runs comprising two races of salmon in the Atlantic rivers has been continued. In the Miramichi and Margaree rivers, where the late run predominates and parent salmon are caught during their upward migration, after August 25, eighty per cent of the recaptures were caught before August 15 and less than twenty per cent after that date. Adjoining rivers, similar in character, are being stocked, in one case with the fry from a river in which the run is predominately early and in the other case from a river in which the late run predominates and the early run has practically ceased to exist.

The good effects of fish culture have become more and more apparent on all sides. Very few salmon ascended the rivers of Prince Edward Island previous to the establishment of the hatchery in 1906, but as a result thereof all of its rivers and larger brooks were practically teeming with salmon during the last spawning season. Salmon have not been seen in the Nashwaak river, N.B., for over fifty years, but as a result of systematic stocking it carried a heavy run last season. Notwithstanding the fact that the close season was recently abolished in the Great Lakes, the whitefish fishery is increasing steadily and the catch per net in lake Winnipeg was last year greater than it ever was. The upper waters of the Fraser river, B.C., where no hatcheries have been operated, have for several years been practically depleted of salmon, while good runs have annually occurred in the lower reaches where several hatcheries are located. There was a larger number of spawning sockeye in the Birkenhead river last year than there has been for thirteen years past. The Fraser river situation, however, cannot be successfully handled otherwise than by proper international co-operation. The run of sockeye to Anderson lake, Vancouver island, was fifty per cent greater than it was in the previous year, which was the best for ten years previously. It is estimated that not less than seventy thousand sockeye reached the spawning areas of this lake. Definite runs have been established in many areas to which sockeye did not resort before they were stocked from the hatcheries, and most satisfactory returns are apparent from several of the prairie lakes that have been stocked with whitefish. Whitefish are also returning to the southerly portion of Georgian bay, as a result of the Collingwood hatchery.

A report in detail of the fish cultural operations of the Department is being published in pamphlet form.

#### OYSTER CULTURE

The officer in charge of this service examined the various oyster fishing areas in the gulf of St. Lawrence and cleaned the beds which required cleaning.

The Bay du Vin area was found to be in a satisfactory condition.

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In Richibucto river the oysters transplanted two years ago were examined and found to have grown considerably.

The grounds at Caribou, N.S., where oysters from the United States and Prince Edward Island had been planted some years ago, were found to be clean and in good condition. The oysters have grown well, especially those from Prince Edward Island. But no evidence of spat or young oysters could be discovered and the officer is of the opinion that reproduction has not taken place because the water in which the oysters were transplanted is of much greater salinity than that from which they were taken.

The oysters planted in the harbour of Brule, N.S., during the spring of 1919 were found to be growing remarkably well. There was practically no mortality in this transplanted lot.

In Charlottetown harbour and surrounding waters the beds are in good condition. Here during the oyster fishing season the officer boarded the boats, inspected the catches and gave advice to fishermen with respect to culling the undersized oysters and returning them to the beds.

The areas in Richmond bay, P.E.I., which became depleted a few years ago by a disease which practically killed all the oysters, show no signs of improvement yet. The beds, both public and private, as a result of not being fished in the last two or three years are becoming overgrown with eel grass and mussels.

The beds in Cascumpeque bay seem also to have fallen a prey to the disease since last year, as no live oysters were caught there except on some fresh beds in Kildare river.

## BIOLOGICAL STATIONS OF CANADA.

The two Biological Stations under the direction of the Biological Board of Canada had the most successful season during 1920 in the history of biological research in Canada. In addition to the paid staff of eight persons in the station at Saint Andrews, there were nearly twenty scientists who carried on investigations. Professor A. B. Knight, Kingston, Ont., chairman of the Biological Board, conducted some difficult and lengthy experiments on the influence of temperature on newly-hatched lobsters and he devised a method of rearing them to a somewhat advanced stage. When Professor Knight left for Prince Edward Island at the end of July, Professor Prince continued the investigations and a number of young lobsters were reared through a series of the early stages and these stages were preserved so that it would be possible to prepare a very detailed report on the changes which these young lobsters undergo in their early life history. Professor L. W. Bailey, Fredericton, continued his studies of Canadian Diatoms and paid special attention to a valuable collection from Quill lakes, Sask.; Professor A. W. Willy, McGill University, examined a large collection of Plankton material from the Miramichi river. He drew up descriptions of a series of Copeoda, which will be of great importance in connection with the feeding habits and migration of the smelt and other fish inhabiting the river. In addition, he studied the microscopic Crustaceans from Quill lakes, which had been obtained during the early summer; Dr. F. C. Hainsman, McDonald College, spent a short period at Saint Andrews superintending the scheme for studying of fish bacteriology; Professor Cox, Fredericton, concluded the important study of the life-history of the tom-cod. The Station was fortunate in having Professor Clara Benson at Saint Andrews, carrying on elaborate investigations into the chemistry of the flesh of various fishes; and Miss McFarlane, Toronto; Miss Symons, McGill University, and Miss Williamson, Columbia University, engaged in the bacteriology of lobsters, clams, etc., the last named also studying the important question of the alleged shrinkage in weight of lobster meat after undergoing the canning operation; Dr. F. S. Jackson, McGill, completed some remarkable studies on the changes undergone by the muscle of fishes during the freezing process, a subject of very great practical importance from a food point of view; Pro-

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fessor J. W. Mavor, Schenectady, continued his important work in determining the movements of water in the Bay of Fundy, his results, which included the summarizing of a large number of records of floating bottles placed in the currents of the bay, seem to show that these are much more complicated than had been supposed, and the whole investigation will be one of very great interest when published; Professor Connolly, Antigonish, N.S., made a biological study of the young stages of certain Decapod Crustaceans; Miss E. K. Chant, Toronto, completed a report of the life-history of the smelt of the locality, including a very interesting study of the eggs and young stages; while Miss M. A. Reid, of Toronto, pursued investigations upon the eggs and changes in the life-history of a peculiar marine animal, called *Sagitta*. Professor A. Vachon, Laval University, Quebec, made chemical and physical examinations of samples of water from western lakes, including the Quill lakes. In addition, to the biological work carried on in the Station and in the waters adjacent to Saint Andrews, researches on the life-history of the shad were made by Mr. A. H. Leim, of Toronto, in the waters at the head of the Bay of Fundy, and Professor Knight, Mr. D. A. McKay of Ottawa and Professor A. B. Dawson, Loyola College, Chicago, completed further investigations on the lobster fisheries, which have formed the subject of elaborate studies for several seasons. The researches of the young lobsters and their behaviour in early life formed an important part of the work, and a report of great value to the fisheries is in preparation. The board took advantage of an opportunity which offered itself of procuring biological collections from the east shore of Hudson bay and James bay. Mr. Frits Johanssen was given by the department a sufficient vacation to visit these regions, where very little hitherto has been ascertained as to the biology and general conditions of the fisheries of these waters. This observer was instructed by the board to visit this remote area and has brought back a very important collection of fishes and all marine life, which will be of unusual interest when reports upon it are completed.

Professor A. D. Robertson, London, Ont., assisted by Mrs. Robertson and a small staff, extended his oyster studies on certain important beds in Prince Edward Island. The several reports which Dr. Robertson has previously made upon the oyster areas will receive important additions and be supplemented extensively by a further report on the work carried on during the season of 1920. Professor A. G. Huntsman, curator of the Station, and who had general direction of the biological researches carried on, was at Saint Andrews from June to late October, and in addition to his onerous duties as head of the Station, he studied the influence of light on the growth of mussels, and superintended the smelt and *Sagitta* investigations, as well as conducting the dredging and other investigations in the open sea.

Much material has been supplied to Principal Harrison to aid him in his investigations at MacDonald College upon the canning of lobsters and curing of fish; and Miss Fritz, of Toronto, also continued the study of material which had been collected on the Miramichi region in 1918.

A very important piece of work was carried on from October 8 to 12 in a series of tow-net operations off Southern end, Grand Manan, in order to ascertain the distribution and movements from the spawning ground, in that vicinity of vast schools of young herring occurring there. In August and September several Hydrographic and Plankton expeditions were made in the Bay of Fundy when drift bottles were put out in order to obtain the records of the movements and currents desired by Professor Mavor, and some similar studies including a general Faunistic investigation, was made at the Minas basin and other waters at the head of the Bay of Fundy.

In September it may be added, that Professor Prince and Professor Huntsman left the Station to give technical instruction to fisheries officers at Truro, N.S., when a large assemblage of the inspectors from all parts of the Maritime Provinces met together under the chairmanship of Chief Inspector Ward Fisher, and a very successful

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series of sessions were held and important information on fish and fisheries imparted. Several biological lectures were delivered by arrangement in Truro at the same time and were largely attended by the Normal School teachers and the public.

The Fisheries Museum at the Station which has proved a great attraction each season, has been much curtailed owing to the necessity of placing research tables between the museum cases, a condition necessary owing to the very large staff of workers who attended during the season of 1920. A refrigeration apparatus divided into three compartments has been constructed for experimenting with frozen fish and other sea produce. An ammonia refrigeration machine has been installed, in order to control the temperature. The library has received considerable additions, and the catalogue has been very much extended so that the staff can make constant use of the valuable works now on the shelves.

The Biological Board has been impressed by the necessity of increasing the accommodations, both in the laboratory and in the residence for workers, as there is every possibility that the number of Canadian scientists in future seasons will be greatly increased and accommodation must be found for them. The heating and lighting of the buildings requires also improvements, and a plan for extension and for installing electric light, etc., is now before the Board.

*Pacific Biological Station, Nanaimo, B.C.*—The Station at Nanaimo has had a very profitable season under the direction of Dr. C. MacLean Fraser. In addition to important Faunistic and fishery investigations conducted by Dr. Fraser himself, Mr. C. Berkeley, the assistant, has also been engaged in chemical and bacteriological investigations. The staff included a number of workers from the University of British Columbia and it is certain that in the future there will be an increasing number of able workers sent to the Station each season from the university. Dr. Fraser was offered the Professorship of Zoology by the University, which he accepted after consultation with the Biological Board and the completion of an arrangement whereby he can still continue as head of the Station and direct all investigations. He will also carry on his work in the university as professor, which will be invaluable to the work at Departure bay. Professor A. T. Cameron, Winnipeg, resided at the Station during the season and carried on some valuable researches in addition to the splendid investigations which he had begun in British Columbia waters in the spring season. Professor J. B. Collep also returned to the Station and engaged in some very elaborate biochemical investigations upon certain fish and other forms. A considerable amount of Faunistic work was done and a series of problems relating to fisheries which the department in Ottawa had handed to the Biological Board, were investigated at the Station and reports upon them have been prepared or are in course of preparation.

The biological volume which was announced as nearly ready for publication last year has been delayed, and this delay has enabled several new papers to be included so that the publication entitled, "Biological Contributions, 1918-20," will include no less than sixteen very valuable reports containing original results on fishery and other investigations carried on by the staff at both laboratories. There is a great demand among scientists in Canada and the various parts of the world for these publications, which are sent to a large number of the principal libraries in the Dominion and Europe. It may be added that Professor Prince, after occupying the position of chairman of the board for over twenty years, has retired from that position, and Dr. A. P. Knight, of Kingston, has been chosen for the position, but Dr. Prince will continue to act as secretary-treasurer of the board. Professor Ruttan, it may be added, has replaced Professor Adami as representative of McGill University, Dr. Adami having accepted the position of Chancellor of the University of Liverpool, England.

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## REVIEW OF THE FISHERIES OF 1920

The year 1920 has been a rather trying one for the industry as a whole. During the war, and since, the cry of the world has been for increased production of food. To this cry the fishing companies and the fishermen, even though inroads had been made on their numbers by enlistment, splendidly responded; but since the armistice there has been a serious drop in the consumption of fish and a consequent slowing down in the demand therefor. One result was a sharp reduction in the prices of fish, but unfortunately this reduction reflected itself more speedily and in greater degree on the producer than on the consumer. On the other hand the equipment with which the fishermen were supplied had been purchased at high-water prices, and from which there was little reduction when replacements had to be made during the year.

The canning industries on both coasts have carried on under heavy handicaps. The prices paid for tin plate were very high and labour costs continued heavy throughout the season.

While owing to these and kindred conditions the year has not been as successful as would be desired, the industry faces the coming season in a healthy and vigorous condition. It realizes as it has never realized before that if Canada is to take the place in supplying the markets of the world that her premier fishery resources warrant, our fish must be so prepared for market as to favourably compare with the best from any other country, and that if our domestic demand for fresh and frozen fish is to be rapidly expanded, not only must fish in perfect condition be placed in the hands of the consumer but at moderate prices. Arrangements are being made accordingly to a greater extent than ever before.

The department has been doing much to stimulate improved methods of handling and curing fish, by investigation, and affording information, by publicity, and by obtaining needed legislation.

The compilation of the detailed statistics of the fisheries for the year 1920, which are now published in the form of a separate statistical report by the Bureau of Statistics, has not been completed at the time of writing, consequently an estimate only of the total value, and a general summary of the results of the year's operations, can be given here.

The marketed value of all fish and fish products is estimated to amount to approximately \$50,000,000. This is a decrease of about \$6,000,000 compared with the value for the preceding year. The decrease is chiefly attributable to a diminished pack of fall salmon in British Columbia, and a poor demand therefor; also to a smaller catch at lower prices of cod, haddock, and such like fish of the Atlantic coast.

## ATLANTIC FISHERIES

*Cod, Hake, Haddock, and Pollock.*—The greater part of the catch of the four kinds named above is split, salted and dried, for consumption chiefly in foreign markets where it comes into competition with products of the same nature from Newfoundland and the United States, Norway, Great Britain, etc. As a result of the unsettled condition in which the business of the world still is since the ending of the war, and the landing of prewar supplies by the fishing fleets of Europe those markets have become temporarily blocked. Consequently, prices fell off the second half of the year especially, and many fishermen finding themselves unable to continue, gave up fishing and sought other occupations, with the result that the aggregate catch of these fish under review fell below that for the year before by approximately 1,000,000 cwt.

*Mackerel, Herring, and Sardines.*—The mackerel fishery was not as successfully prosecuted as in the preceding year, owing to rough weather in the early summer, and the fact that the fish did not come close to the south shore of Nova Scotia in

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their usual numbers. The catch of that province, which furnishes the bulk of the total catch, fell off by about 90,000 cwts. There were decreased catches in New Brunswick and Prince Edward Island also, but the Magdalen islands' catch was substantially greater.

The herring catch of Nova Scotia was about 20,000 cwts. less, while that of New Brunswick was 180,000 cwts. greater than in the preceding year. The New Brunswick increase, however, was neutralized by a decrease in Quebec, particularly at the Magdalen islands.

The sardine fishery of the Bay of Fundy was financially a poor one. The catch was nearly as good as the preceding year's one, but the prices paid by the cannery were too low for profitable operation of the weirs. This industry has not yet recovered from the slump in the demand for the canned product which took place at the close of the war.

*Other Sea Fish.*—The catch of halibut was about 40 per cent less than in the preceding year. The landings of swordfish, albacore, flounders, and tomcod, were considerably less also.

*Shell-fish.*—It is very gratifying, especially under present conditions, to be able to report that on all parts of the coast the lobster fishery, which is one of the most important of our fisheries, gave excellent results with regard to both quantity and value, so far as the fishermen were concerned at least. Some of the packers and dealers, however, were not quite so fortunate. Much of the canned product was held for higher prices than were offered at the opening of the season, but in the face of an accumulation of stocks and of falling market, sales were ultimately made at considerably less than the first prices offered.

The present regulations seem to have at last arrested the diminution of the stock of this shellfish, which would appear to be now capable of maintaining itself naturally.

About the same quantity of oysters was taken as in the preceding year. The prices were somewhat easier. The total quantity of clams taken was less. This was possibly due to the fact that fewer clams were required for bait owing to the curtailment of line-fishing operations. Quite as many clams were canned as in the preceding year.

The fishery for scallops was extended by the discovery of important beds in Digby basin and vicinity. The total catch, however, was not equal to that of the preceding year.

*River Spawning Fish.*—The Atlantic salmon catch fell short of that of the preceding year. The smelt fishery resulted in a decrease of 15,000 cwts. In Nova Scotia and New Brunswick, the quantity taken was less, but in Prince Edward Island it was greater. The catches of alewives and shad were not quite so good as in the preceding year.

## INLAND FISHERIES

In Alberta and Saskatchewan there was a decrease in the catch of all kinds of fish. There were fewer fishermen operating and winter fishing was delayed owing to the late formation of ice on the lakes, while the lack of snow made it impossible for operators to reach the more distant points where the best winter fishing takes place. The demand for fish exceeded the supply, however, and prices were somewhat higher than in the preceding year.

There was a decreased quantity taken from the lakes of Manitoba also. Winter fishing was a month later in being started because of the mildness of the winter. High wages in lumber and mining camps drew the number of men away from the occupation of fishing.

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## PACIFIC FISHERIES

*Salmon.*—The pack of salmon of all kinds throughout the province of British Columbia was about 200,000 cases less than in the preceding year. The shortage was almost entirely in the pack of the varieties known as pinks and chums. The scarcity and high prices of food supplies during the war years caused these kinds to be accepted at prices equal to those paid for sockeye in the prewar years, with the result that large quantities were packed. Since the war ended, however, it has been found difficult to market pinks and chums. Consequently, not nearly so many were packed last season. In contrast to this, it may be noted that the expensive sockeye is as much in demand as ever it was.

The pack of sockeye in the Fraser river district, while not a great one, was considerably greater than that of the year before. An important contributory cause of this and also of the unusually large number of spawning fish said to have reached the spawning beds was no doubt the limited amount of purse-seine fishing in Puget sound by American fishermen, which permitted a greater proportion of fish to escape to the river and its spawning places further up. There was a greatly increased pack of sockeye in the Rivers Inlet district. The pack of sockeye in the Skeena river district was equal to that of 1917, but very much less than that of either 1918 or 1919. In the Naas river district, the pack was disappointing, as was also that of the canneries on Vancouver island. In the latter district the canneries are dependent mostly on fall fish, and as market conditions for such were not good, the pack was much curtailed.

*Halibut.*—The halibut fishery which centres at Prince Rupert was successful financially during the season of 1920. For a while in the summer time a shortage of refrigerator cars temporarily interfered with fishing operations. But, taken all through, the season was a good one financially.

*Herring.*—The chief seat of the herring fishery of British Columbia is in Vancouver island—in the Alberni district on the west coast, and the Nanaimo district on the east coast. The fish came in great quantities during the winter season and the catch was much larger than that of the year before. The great bulk of it was salted for shipment to the Orient but owing to financial conditions in that part of the world the business, for the time being, was not so good as it otherwise would have been. An increased quantity was used in a fresh and smoked condition throughout the province.

*Other Sea Fish.*—Pilchards appeared in their usual abundance on the west coast of Vancouver island. Four canneries engaged in the canning of this excellent food-fish and a much greater quantity was packed.

The fishery for cod and for flat fishes was satisfactory. The demand for these fish is increasing with a healthier and steadier local market.

*Whales.*—The Rose harbour, Naden harbour, and Kyuquot whaling stations were in operation, and 493 whales were caught. In the preceding year the catch was 432.

## GENERAL.

The weather during the first four months of the year, especially on the Atlantic coast, was stormy and cold. Fishing operations were greatly interrupted thereby and much gear was either lost or damaged. Two steam trawlers were lost entirely. Unfortunately the prosecution of the fisheries, especially in the open sea, is attended with an annual loss of life. During the year under review, I very much regret to say, there were thirty-four lives lost, twenty-four on the Atlantic and ten on the Pacific.

In conclusion it affords me pleasure to state that the officers and clerks of the Fisheries Branch performed their duties efficiently and satisfactorily during the past year.

I am, sir, your obedient servant,

A. JOHNSTON,  
Deputy Minister of Marine and Fisheries.

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## APPENDIX I

## REPORTS OF INSPECTORS OF FISHERIES

REPORT OF CHIEF INSPECTOR WARD FISHER, EASTERN FISHERIES  
DIVISION, FOR 1920

The reorganization of the division, undertaken last year, has not yet been perfected. A fair degree of success has been obtained, notwithstanding that the full permanent staff of officers have not yet been secured. Many of the new officers have shown a most intelligent interest in their work, and give evidence of a strong desire to thoroughly acquaint themselves with every phase of the fishing industry.

New and important problems vitally affecting the industry are constantly arising, and in the nature of things the ability of the staff will be heavily taxed to successfully meet them. I am confident that within a reasonable time, by proper training and efficient oversight, that the general administration of the division will show gratifying progress.

## APPOINTMENT OF TWO INSPECTORS

Vacancies in the inspectorates of two of the more important districts will necessitate the appointment of officers for these two positions. Hon. Donald Morrison, the inspector for northern New Brunswick, died in November last, after a brief illness. Mr. Morrison was an efficient inspector. Mr. R. Hockin, for nearly thirty years inspector for eastern Nova Scotia, is to be retired on the appointment of a suitable person to succeed him. Mr. Hockin was one of the most experienced officers in the division; wise in counsel and cautious in decision. These two vacancies add to the difficulty of successful supervision.

## GENERAL CONDITION OF THE INDUSTRY DURING 1920

In the report for 1919 reference was made to the abnormal conditions affecting the industry in consequence of the unexpected ending of the great war. The dealers were caught with heavy stocks on hand which, owing to the extraordinary world conditions, practically financial, could not be readily marketed, even at greatly reduced prices. In addition, the cost of supplies and the high operating expenses continued, forcing the dealers and manufacturers to greatly curtail operations, with the result that the volume of fresh and manufactured fish declined. These conditions resulted in greatly curtailing the operations of the shore fishermen. In some localities the catches did not bring returns sufficient to pay operating expenses and afford a means of livelihood, resulting in a considerable number of the fishermen engaging in other operations. The lobster fishery was practically the only principal fishery that continued highly remunerative to the fishermen.

The dealers were more heavily hit than were the fishermen, as the heavy stocks on hand were difficult to profitably dispose of owing to depressed markets. In other words, the dealers were in the unfavourable condition of being heavily stocked with the goods of the previous year, and therefore unable to encourage large catches for 1920.

The past year has therefore been the most trying for many years, notwithstanding that the total catches and values greatly exceed the catches and value of the normal year preceding the great war, when the total marketed value of the fisheries of this division was \$13,886,780. This total increased during 1915, 1916,

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and 1917 to over twenty-two and one-quarter million dollars. It will be interesting to note that last year the total marketed value for western Nova Scotia alone amounted to approximately \$5,982,367.

The catch of the Lunenburg fleet will show a shortage in value of considerably more than \$1,000,000 as compared with the previous year, notwithstanding that the catch was only about 4,000 quintals less.

The catch last year was 295,150 quintals, and the number of vessels in the fleet was 105, and therefore the average catch was 2,810 quintals per vessel for the season. This year with 117 vessels in the fleet and a catch of 291,475 quintals, the average is 2,488 quintals.

Last year the fishermen received \$14 per quintal for their first trips, and \$12 for their second and third trips, whereas this year the fish brought \$12.50 early in the spring, later dropping to \$9.25, while the summer catch sold as low as \$8.25, with large quantities remaining on hand.

With the present high cost of outfits, labour, etc., and if the fish bring only \$8.25 per quintal or less, a large number of the vessels will have operated at a loss. This also has affected the shipbuilding industry to such an extent that practically every shipyard in Lunenburg county and along the south shore engaged in building fishing vessels has been closed down, and the workmen are now going elsewhere to seek employment.

While for the four years, 1915-18, there were substantial increases in the catches of the principal varieties of food-fish, the increase in the marketed value of the catches was due almost wholly to conditions brought about by the war. Food became a world need of grave concern, and the fisheries were looked to to take the place of meats and other supplies required for the vast forces of the allied armies. Cost was of minor importance, and therefore every inducement was given to produce and manufacture fish-food products, with the result that there was a great and increasing rise in prices consequent to the increasing demand and increasing cost of operations.

The past year has been largely a year of readjustment to normal conditions, and the difficulties of the situation have been greatly aggravated by the large volume of goods which it has been difficult to dispose of at any price.

#### THE LOBSTER FISHERY

The lobster was the only leading fishery that was prosecuted with uniform success during the year. Indeed, it was the outstanding fishery. The weather was favourable and the catch and pack greatly in excess of the previous year. The fishermen were particularly fortunate, as high prices prevailed, and, consequently, the financial returns were large. The total number of licensed fishermen was 12,226; Nova Scotia having 8,253, New Brunswick, 2,099 and Prince Edward Island, 1,874.

The prices paid by the dealers in live lobsters for the export trade reached as high as 40 cents per pound, while the prices secured by the fishermen for the small lobsters for canning purposes constituted a record. In some districts 18 cents was paid, or 4 cents more than any previous year. Altogether the season was the most profitable to the fishermen in the history of the industry. The total catch was 399,299 cwts., as compared with 345,806 cwts. the previous year.

There was, however, a sharp drop in the prices secured for the canned product. For several years previous sales were made at from \$45 to \$48 per case. In the early season of 1920 the offers were below \$40 per case. Some of the packers and dealers were, however, expecting a repetition of the high prices of the previous year, and therefore large stocks accumulated, and when the prices continued to drop many of the packers were caught with large supplies on hand, and ultimately had to accept offers at less than \$30 per case, and in some instances as low as \$25 per case. The loss at these low prices was serious as they were insufficient to pay the cost of the pack.

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An interesting phase of this fishery was the increase in the catch of medium and large sized lobsters during the past two seasons, as compared with the two previous years. For some time the portion of lobsters of nine inches in length and over, as compared with the catch of small lobsters, was a matter of grave concern, as it appeared that in a few years the fishery would become so depleted that drastic action would have to be taken to preserve it as a commercial industry. This was especially true of the conditions existing in western Nova Scotia and portions of the Prince Edward Island coast. The increase in the proportion of large lobsters, particularly in the prolific district of western Nova Scotia, is attributed to the shortening of the fishing season to three months each year instead of five and a half months as formerly. Whatever may be the cause in this respect it is quite apparent that the fishery has been greatly improved the past several years. The total catches during the shorter season have been almost equal to the total catches taken when the longer fishing season prevailed, and it would appear that the danger of depletion has been overcome, and that the equilibrium between the yearly increase and the yearly catch may be maintained for many years.

There was a serious falling-off in the total catches of the other principal varieties of commercial fishes such as cod, haddock, pollock, herring and mackerel, due almost wholly to the fact that the returns to the fishermen were insufficient for profitable employment. The decrease of the mackerel catch was over 87,000 cwts. as compared with the previous year. Nova Scotia suffered most severely, as the catch for 1919 was about 162,000 cwts., while last year it dropped to 81,000 cwts. The falling-off was due to the abnormal weather conditions prevailing during the month of May, preventing the fish from approaching the shore or schooling near the surface.

## SPECIFIC CONDITIONS

*Prince Edward Island.*—General operations were curtailed owing to the low prices, and many of the fishermen were compelled to engage in other operations.

Fine weather prevailed throughout the lobster fishing season from April 1, and resulted in large catches and increased pack. The total pack was 40,322 cases, as compared with 31,911 cases the previous year.

There was a slight increase in the catch of herring, but a decrease in the value. The smelt fishery was very satisfactory, showing an increase in catch and value. Other fisheries decreased in catch and value, particularly cod, hake and mackerel, the latter being the most serious.

While there was a decrease of over five hundred barrels in the catch of oysters, the sizes and quality was much improved. The prospect for increased catches from the areas in East and West rivers, and Vernon, Seal and Orwell rivers, are good, as the beds are in better condition than for some years. It is to be regretted that the blight, which has been affecting the areas of Richmond bay, continues. The beds in Hill river, Mill river and Lot 6 river are suffering apparently from the same blight, the entire catch of last year being destroyed.

*New Brunswick.*—With the exception of the lobster fishery, the operations of the past year were unprofitable to all engaged in the industry. Fish of all kinds were plentiful, and large catches taken by those who continued operations, but, unfortunately, the market conditions drove many of the fishermen out of the business.

In the Grand Manan district the line fisheries were abandoned. Buyers were hit heavily, as the markets were constantly falling, and the dealers were left in nearly all instances with large stocks on hand which were difficult to dispose of at any price.

The sardine fishery was financially disastrous to the fishermen. The run of fish was good, but the small prices paid by the cannery operators made profitable operations

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impossible. The season opened with prices of \$10 per hogshead, dropping within a few weeks to \$5 per hogshead. When it is remembered that two seasons previously the price ranged as high as \$70 per hogshead, it can easily be realized that a drop to \$5 was most disappointing. With a good run of herring a fair profit may be made at \$10 per hogshead, but it would be difficult, even under most favourable conditions, for the fishermen to pay operating expenses at \$5 per hogshead. Until the sardine markets regain their former buoyancy the present unsatisfactory condition of the fishery will continue.

The smoked-herring industry also suffered severely. This business is carried on extensively in the Grand Manan district, where a large amount of capital is invested, which in past years has made generous returns to both fishermen and operators. A record pack of smoked herring was put up, and the prospects were for a prosperous year but the prices dropped to the lowest level for many years. Some 300,000 boxes of smoked herring of the finest quality are in stock with no market in sight.

The lobster fishery was the one bright spot. A greatly increased catch was made, high prices prevailed, and consequently this fishery was most satisfactory. As an insight into the eagerness with which the fishermen engaged in this industry, it might be stated that one fisherman, fishing alone and operating 70 traps, sold nearly \$500 worth of lobsters in two weeks.

In the northern district lobster packing is extensively carried on, while in the Charlotte-St. John district there are no canneries, the catch being shipped alive chiefly to the United States markets.

*Nova Scotia West.*—The district comprising the seven western counties suffered to a less extent from prevailing unfavourable conditions than any other section of the Atlantic coast. There was a noticeable decrease in the catch of cod, haddock, pollock, and mackerel. The lobster fishermen had the best and most prosperous year in the history of the industry.

It should be pointed out, as showing the importance of the lobster fishery in western Nova Scotia, that 40 cannery licenses were issued and nearly 4,000 fishermen's licenses; 2,157 boats were engaged and 3,908 fishermen employed. The total number of traps operated was 280,000, having a valuation of \$482,000.

Eastern Nova Scotia, comprising the remaining counties of the mainland, experienced difficulties that taxed the ability of the dealers, and greatly embarrassed the fishermen, as the low prices secured by the boat fishermen, and the reluctance of the dealers to add to the stocks, resulted in curtailed operations. The steam trawlers with their heavy overhead expenses had to be kept in commission. While large catches were taken by the trawlers, it was found impossible to market the catches with any degree of profit. Indeed, in several instances, the losses were very heavy, particularly of catches landed at American ports. Two landings, one of 400,000 pounds arrived in bad condition owing to warm weather and had to be sacrificed, entailing large losses.

As in other districts already referred to the lobster fishery was productive and valuable.

*Cape Breton Island.*—This district did not escape the general prevailing conditions along the whole coast. Indeed, the past year was the most unprofitable yet experienced. Owing to the low prices for the catches fishing operations were largely suspended for a considerable portion of the year.

As in the other districts already noted the lobster fishing was carried on with gratifying success. The fish were plentiful, the weather uniformly fine and the prices exceptionally high, resulting in an increase in the catch and in the value of the catch. Six additional lobster canneries were established during the year, i.e., at Main-a-Dieu, Long Point, Eastern Harbour, Ingonish, Inverness and Fourchu.

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There was a decrease in the catch of cod with a decrease in value. Hawkesbury is the only port showing an increased catch, and this was due to the addition of one steam trawler to the fleet.

The decrease in the catch of haddock was large. Ingonish was the chief sufferer in this respect. Hawkesbury showed an increase. No catches of halibut were taken at Glace Bay or at Scatarie, while the catch at Port Hood and Port Hawkesbury was less than one-third the preceding year. Swordfish fishing was prosecuted with quite satisfactory success at Scatarie, Little Lorraine and Louisburg.

## RIVERS AND INLAND FISHERIES

The rivers, streams and lakes of the Atlantic coast provinces constitute an amazing network of waters, nearly all of which are frequented by valuable anadromous commercial food-fishes such as smelt, gaspereau, bass, whitefish, sturgeon, and salmon. New Brunswick leads in the abundance of the varieties named.

The commercial salmon fishery produced a decreased catch as compared with 1919, the conditions being particularly unsatisfactory in the St. John river and tributaries and along the coast of Cape Breton, where the catch was almost negligible.

Sport fishing, particularly for salmon and trout, attracts many thousands of travellers and sportsmen to our rivers each year and constitutes a very valuable source of immediate income and employment. From a sport fishing point of view alone any reasonable expenditure for the conservation, protection and expansion of the river fisheries is justified.

But the value of the river fisheries is very much greater than from the sport fishing viewpoint alone. The valuable commercial fisheries such as smelt, gaspereau, salmon, etc., already alluded to, are wholly dependent on the condition of the river fisheries. These fish must have access to the rivers and lakes for spawning, and unless free access and protection is offered during the spawning seasons, both sport and commercial fisheries, so far as the anadromous varieties are concerned, will speedily be destroyed. And in addition the "off-shore" deep-sea fisheries will be affected by any depletion of the annual runs of the anadromous fishes, as the deep-sea fishes, which are caught in great abundance near the shores, are attracted shorewards by the feeding provided by the runs of the fish to the rivers for spawning.

In view of the above it should be apparent that the protection of the rivers and lakes is vital to the success of both the river and shore fisheries.

The demand for protection is growing from year to year. Many of the best and most prolific salmon and trout rivers have been almost destroyed by illegal fishing methods, and the agitation for more adequate protection is becoming increasingly insistent. Owing to the multitude and magnitude of the inland waterways it is physically impossible, except at most unreasonable cost, to give all the protection called for, but it should be possible and financially feasible to give a satisfactory degree of protection to the principal rivers and streams.

In New Brunswick such important rivers from a commercial and sport fishing point of view is the Restigouche, Miramichi, St. John, and the more important tributaries should have every possible protection. In Nova Scotia the Margaree, the Mira, Musquodoboit, Sheet Harbour, St. Marys, La Have, Medway, Mersey, Tusket and the Bear rivers are among the principal streams that should have every consideration. It is, however, quite impossible for the sixty-five or seventy officers employed for the whole of the Atlantic Coast Division to afford the protection desired, as their time is quite fully occupied in the multitude of duties in connection with the coast and deep-sea fisheries, and the supervision of the fishing generally. The appointment of special guardians is essential, and the perfecting of this service is

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in hand. Emphasis should not be laid on a cheap service, but rather on providing adequate protection. The total number of officers for the whole Eastern Division is hardly a sufficient force for New Brunswick alone.

It must be realized, however, that the vast extent of the rivers and inland waters, when the sparse portion along these waters is considered, should not call for the elaborate protection essential to adequately supervise the whole system of waterways, but every effort should be made to safeguard the fisheries of the principal rivers and streams and to insure the prosperity of the fisheries affected.

#### TECHNICAL EDUCATION

With reference to that portion of the report of last year dealing with the technical education of the fishermen, it may be said that after consultation with Professor Sexton, of the Halifax Technical College, who has the matter in hand, that it was not found feasible to attempt any direct work last year, as it is quite essential that much preparation was required in order to ensure the success of the movement. It is probable, however, that the preparation will be completed the coming summer, and several of the courses instituted before the end of the year.

The conference of the fishery officers of the division was held at Truro in the latter part of September, continuing for five days. The special features were covered by a syllabus prepared by the Biological Board on—

- (1) "Fish and their Environment."
- (2) "Migration of Fishes."
- (3) "Types of Gear."

The conference was of highest importance and carried on with signal success. It is a pleasure to report that a better appreciation of the character of the work and the fishery officers is already apparent. Administration and supervision was found to include more than the routine of duties incident to the enforcement of regulations and preparation of official reports. The fishery officers are no longer to consider the enforcement of the laws as the chief end of their endeavours. This attitude in the past has too often resulted in antagonisms and dissatisfaction. Under the higher conception of the duties of the positions the officers are being impressed with the fact that they are to assist and encourage the fishermen, and by careful study to be able to consult and advise the fishermen and dealers in all matters affecting the industry. The continued technical education of the officers is therefore essential, with the prospect that within a few years they may become experts in the fisheries in their respective districts. The conference for 1921 will be held at Charlottetown, P.E.I.

#### TECHNICAL INVESTIGATIONS

Special interest has been taken the past year in endeavouring to ascertain the primary causes of discoloration in canned lobsters. As it would appear that careless or imperfect processing methods were largely responsible, greater stress is being placed on the processes from the time the lobsters are taken alive from the waters until the canned product is ready for the market. Circulars to be placed in the hands of the canning operators are being prepared, and it is expected that careful compliance with the suggestions and instructions given will largely prevent any discoloration of the meat.

(2) Also, investigations are being hastened in the matter of the red discoloration occurring at times in dried fish, resulting in some instances of serious loss. A number of samples of affected dried fish have been forwarded to the Biological Department of the McDonald College, Montreal, for examination.

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## SCALLOP FISHERY

As the former scallop fishery of Mahone bay, Lunenburg county, N.S., had been showing signs of exhaustion the past several years, action was taken to protect the fishery by the adoption of a regulation shortening the fishing season to a period from December 15 to January 20. Quite satisfactory catches, however, were made last year, each of the smaller boats engaged averaging about seven gallons, shelled, per day's fishing.

From information at hand it appeared probable that a scallop fishery might be developed in other portions of the coast. The fishery officers were therefore instructed to investigate the possibilities in their districts, with a result that it is apparent that a valuable fishery may be developed, as the fish are found to exist in considerable quantities at many points along the coast, including the Miminegash and Cape North districts of Prince Edward Island, Antigonish, Cumberland, Annapolis and Digby counties, N.S., and the Main-a-Dieu district, Cape Breton. Also, as in Quoddy bay, N.B.

The best and most immediate prospect, however, was discovered in Digby basin and the adjacent waters of the bay of Fundy, where there was found to exist large and valuable areas, and instant attention was given to the development of the fishery, which has been successfully conducted the past year. The catches are large, and will doubtless result in the development of remunerative industry.

Investigation should be continued to ascertain the extent and importance of the areas already discovered, and particularly in the Nova Scotia Bay of Fundy district.

## TUNA FISHERY

The development of the tuna, or albacore, fishery is interesting. Considerable numbers of this species of large fish have been frequenting the coast for some years, but until quite recently they were looked upon as a nuisance by the fishermen, and when taken incidentally were utilized for the manufacture of farm-land compost, as they were not looked upon as a desirable food-fish.

Some ten or twelve years ago, however, a market was found in the United States, chiefly in Boston and New York, and considerable shipments were made each year from Clark's Harbour district of Shelburne county, realizing about 3 cents per pound. The market has been steadily increasing and shipments made this year were disposed of at 9 cents per pound.

No special effort, however, was made for capturing the fish until three years ago, when the several enterprising fishermen of Hubbards utilized a double-headed mackerel trap-net, which was operated off Hubbards during the tuna run. Catches were readily and profitably marketed in Boston at good prices, and in the last two years particular attention has been paid to the fishery.

The value of the tuna as a food-fish will compare favourably with any of the large fishes, the steak portions not being unlike a good quality of beef. Indeed, it is difficult to discern properly prepared chipped tuna steak from chipped beef. The flesh is held in high esteem by the Italian and Portuguese residents of Boston and New York and a good trade in the canned product could easily be secured for a large pack, particularly if put up in oil.

Canned tuna has already taken a good position in the retail trade. The chief difficulty in establishing a canned tuna industry is that the supply cannot be relied upon. A school may strike in at any time during July and August and not be followed by any other schools for several weeks. It is quite possible, however, with proper facilities, to preserve the catches in good condition for canning for several weeks, and thus provide sufficient supplies to stabilize the operation of a cannery during the season.

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There is little or no retail trade in tuna in the Maritime Provinces, for, as already noted, its value as a food-fish has not yet become recognized.

Early in September, about the close of the run, Messrs. Bach and Finn, the official photographers of the Department of Trade and Commerce, succeeded in getting a complete series of "shots" covering the fishery at Hubbards. The whole intensely interesting operation of "playing" the big fish in the spiller, killing and landing them, was most successfully secured. These pictures are, without a doubt, the only views of the kind existing, and will doubtless awaken much interest when they are shown on the screens throughout the country.

It should be said that a considerable number was taken in the trap-nets at Port La Tour, Shelburne county, in September, over one hundred being captured in one day.

#### MACKEREL CRUISING EXPERIMENTS

Among the interesting developments during the past year were the mackerel cruising experiments. The purpose of the mackerel cruising experiments was to locate the spring schools, and three of the fishery protection cruisers, the *Hochelaga*, the *Arras*, and the *Arleux*, with wireless equipment, were stationed off cape Sable early in May to watch for the approach of the mackerel schools.

Complete arrangements were made for the transmission of information to the radio stations, and its instant despatch to the telegraph operators at the principal points along the coast, and from these points to be communicated by telephone to the fishery settlements and stations. The whole south shore coast from Yarmouth to Canso was thus kept advised of the movements of the fish and the apparent volume of the movement.

#### THE FISHING SCHOONER RACE

Among the events of outstanding interest was the ocean race off Halifax between the Lunenburg fishing schooner *Delawana* commanded by Captain Thomas Himmelman one of the successful "killers" of the Grand Banks fleet, and the Gloucester fishing schooner *Esperanto*, commanded by Captain Marty Welch, a native of Digby county, N.S. The arrangements were in the hands of a competent committee of business men, and the publicity given the event aroused international interest, especially among the fishing fleets of the Canadian and American Atlantic coasts. The prizes were \$4,000 for the winner and \$1,000 for the loser. The race is expected to be an annual one.

#### PATROL BOATS

The patrol boats are continuing to perform essential service along the coast. While they are chiefly used for the prevention of illegal lobster fishing, their services are frequently required to assist the shore officers.

The *D* and the *Nelson* operated in Prince Edward Island, the *A*, *B*, *C*, *E* and *F* in Nova Scotia, and the *G*, *Phalarope*, *Hudson* and *Mildred McColl* in New Brunswick.

The *Seagull* has been taken out of the service, as the condition of her hull did not warrant the expense necessary to put her in good condition. She will be disposed of and not replaced. The *Hudson* was also laid up for similar reasons and will be disposed of. She was replaced by the *Mildred McColl*. One of the western Nova Scotia boats will be assigned to assist the *Mildred McColl* in the patrol of the large and important lobster fishing coast from Northumberland straits to Bay Chaleur. Other changes are in contemplation with a view to perfecting the service and reducing the operating costs.

The service rendered by the boats is of most valuable character, and cannot possibly be performed by any other means. The results accomplished since the inauguration of the service in preventing widespread illegal lobster fishing has been due very largely to the work of these boats.

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## THE FISHERIES OUTLOOK FOR 1921.

A decline in the cost of fishing supplies and outfits is already taking place, and with this decline the fishermen will be more advantageously situated than during the past year, and therefore it is quite probable that the industry will be prosecuted with greater energy. Further, it may be taken for granted that the prices for the catches, with the possible exceptions of small lobsters for cannery purposes, will continue at least on a par with the prices prevailing the past year. Indeed with the resumption of operations by the dealers there is every reason to believe that the fishermen will receive higher prices for their fresh catches.

It must not be overlooked, however, that the trade has important problems to solve before any sound basis is secured for a permanent and successful business.

The fresh fish trade is comparatively small, and the prospects are that it will continue in this unsatisfactory condition unless methods are devised to take advantage of the markets. The Canadian is restricted to a few centres of population. The hazard of the trade, with distant centres such as Montreal and Toronto are not appreciated by the average consumer, and, indeed, owing to the nature of the trade, which demands that fresh fish shall reach the consumer at the earliest possible moment after being taken from the water, it has been difficult to very greatly increase the Canadian consumption of fresh fish.

In any consideration of the expansion of the industry the export trade must not be overlooked. The statement that there has been only a very inconsiderable increase in the catch during the past twenty-five or more years is quite true, and this lack of expansion must continue unless the export trade is increased. The Canadian market is limited. Our population is small, and the centres of population too remote for any appreciable extension of business. The expansion of the Canadian market must in the nature of the case depend largely on the increase in population.

It should be quite evident that the export trade is the key to a big trade door, and there is no sound reason why the fisheries of the Atlantic coast should not very greatly develop, and the industry profit, from the markets of the world.

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## REPORT OF INSPECTOR J. E. BERNIER, M.D., ON THE SEA FISHERIES OF QUEBEC, FOR 1920.

The statistics, which I have already forwarded to the department, compared with those of last year, tend to show a considerable decrease in the fisheries of the Gulf Division both in value and quantities.

After my departure from Quebec, on the 10th of June, on board the *Loos*, about five weeks later than usual, with a view to undertaking the supervision work in the gulf, I visited the different sections of the district: North shore, Magdalen islands, Canadian Labrador, counties of Gaspé and Bonaventure, for the purpose of distributing as soon as possible the fishing bounties and licenses, of disposing of a number of complaints on the part of fishermen, and of making myself acquainted with the fishing operations carried out since the beginning of spring.

I observed profound uneasiness existing among the fishing population on account of the excessive prices of all commodities of first necessity, of the low value and scarcity of cod and salmon, of the loss of time caused by the presence of large schools of porpoises on the coast of the county of Saguenay, as well as of the high wages offered fishermen in the different lumbering enterprises in the interests of which there was a great demand for manual labour. At the beginning of the season it was easy

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to foresee what the final results would be. The two most important counties, those of Gaspé and Saguenay, excepting Magdalen islands, did not yield half the value of the preceding year. On the other hand at the Magdalen islands, owing to the abundance of mackerel and to extensive preparations made in the course of winter for lobster fishing, the result was equivalent to that of the season of 1919. A large decrease is also noted in the yield of the fisheries for Rimouski and Bonaventure.

At the end of June a large number of fishermen had already begun to move to small industrial centres and to cities for the purpose of looking for more lucrative employment; giving up, with the evident intention of not taking it up again, that trade to which they had devoted the occupations of their whole life. The wave of depression now sweeping over all our fishing villages, under the influence of causes which do not seem to be disappearing is such as to give birth to a sentiment of grave uneasiness for the future of the industry in that part of the country.

## COD

This fishery, the most important of the Gulf Division, has been a failure; certain sections were particularly affected. On the north shore the migrations of porpoises in schools of thousands have caused considerable losses, and should their appearance in the gulf continue to occur from year to year, it becomes evident that they will drive away from that coast a good portion of the population. The capture of those animals, practised on a high scale, would be a source of benefit, but as it requires improved and expensive apparatus, it cannot be expected that local enterprise will take it up. They are much more noxious than dogfish and certain newspapers have even thought that the public powers should intervene and help to exterminate them in the same way as it is done on the coasts of France, where suitable vessels and boats have been fitted out for that purpose at the Government's expense.

In the Canadian Labrador cod-fishing is usually very active during the months of June and July. It was nearly a complete failure this year in the course of those two months on account of the jamming of ice, the absence of caplin and the prevalence of easterly winds. In the western part the results were disastrous for most fishermen; many have not even derived a sufficient amount of revenue to defray the dues on their trap-net licenses. In the eastern part those who have persisted in waiting for more favourable conditions, succeeded in making, in the first part of August, catches corresponding in quantities to the average of the past year.

At the Magdalen islands, owing to the low prices offered, fishermen neglected cod fishing and engaged in some more remunerative kind of fishery.

On the coasts of Gaspé and Bonaventure, cod has given the poorest yield ever recorded. The few fishermen who had not given way to the discouragement over the failure of their operations during the first months, got nothing but small quantities of fish at the end of the season.

## SALMON

This fishery, which has been constantly declining these last years has suffered a further decrease. Several license holders did not even deem it advisable to set their nets and removed them after a few days of operations. This peculiar circumstance forms a topic of conversation among the interested who endeavour to explain the falling off by various views of natural history principals. If it is true that salmon have a tendency to come back to their breeding grounds or grounds already frequented by them after more or less long periods of absence without anyone being able to determine the temporary causes which incite them to act in this way, it would seem that there are, in the river and gulf of St. Lawrence, causes of a permanent character to explain their gradual disappearance from year to year. It is reasonable to believe that when

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they had access to all the rivers flowing into the St. Lawrence river, and as far as lake Ontario, to spawn at liberty, they could reproduce themselves with more facility and consequently assemble there in larger quantities.

But it is a well-established fact that nowadays salmon have ceased frequenting quite a number of rivers formerly very much appreciated by sportsmen. West of the mouth of Saguenay they have practically disappeared. Even east of the Saguenay we have observed, these last years, several other streams entirely depleted of fish or on the verge of being so, either for lack of supervision or for having been spoiled by sawdust, mill refuse, etc., or for lack of suitable fishways. Among other rivers, I may mention the following: Bergeronnes, Escoumains, Bersimis, Bec-sé, Rimouski, Matane, Cap Chat, Sainte-Anne-des-Monts, and Mont-Louis, which not long ago were frequented by an important number of anglers, and which are now considered as of little value. By devoting to those rivers particular attention, they would not perhaps recover their old prosperity, but they could at least be partially restored.

As the lumbering industry rapidly develops in the Gulf Division and has a tendency of extending eastward as far as the shores of all the rivers where it is possible to obtain lumber it consequently threatens those rivers with the same fate as other streams situated further west. As there will likely be soon a complete reorganization of the fisheries service throughout the district, it is my duty, I think, to draw, in a particular way the attention of the Department to the present conditions of our rivers. I am convinced that the decrease of salmon in the tidal waters is due to some explainable causes, and that their conservation for sport and trade purposes deserve, more than ever, serious attention and should be secured by the application of new protective measures.

The rivers of the counties of Gaspé and Bonaventure are generally more prosperous than those on the North Shore and those flowing into the St. Lawrence river.

## LOBSTERS

The high prices paid in 1919 had encouraged both fishermen and canners to undertake more extensive preparations for the season of 1920. Owing to this increased activity, to the abundance of bait, and to favourable weather it is noted that this fishery has given a yield greater than that of the preceding year.

Expecting the county of Bonaventure, where there is practically no fishery overseer for its supervision, the regulations regarding lobster fishing were faithfully observed. Four legal proceedings were taken at the Magdalen Islands, but they related to offences committed in 1918.

## MACKEREL

The mackerel fishery which is chiefly carried on at the Magdalen Islands, shows an appreciable increase compared with the catch of last year. Mackerel have a tendency to come back in increasing quantities into Baie-des-Chaleurs, a fishing area which had been deserted by them for some years. The fishermen of that locality are not equipped however for the carrying on of this fishery in a paying way, and little attention is given to it.

At the Magdalen islands, owing to the little care given to the handling and preparation of this fish for the market, the benefits derived from its industry are far from what we could reasonably expect. The rigorous application of the new regulations concerning the inspection of fish products which become effective in 1921 would tend, it seems to me, to remedy that abnormal state of things. If our fishermen were perfectly acquainted with the most suitable methods to prepare that fish as well as with the benefits to be derived by offering for sale a first-class product there seems to be no reason why our products should be inferior, as a food, to similar articles procured elsewhere.

## HERRING

Fall herring which could be obtained in nearly unlimited quantities in the eastern part of the Canadian Labrador seem to gradually come back to the fishing grounds from which they had disappeared for about thirty years. According to the fishermen of the neighbourhood of Bradore bay thousands of barrels could have been salted if they had had at their disposal the necessary apparatus to capture and prepare that fish.

At the Magdalen islands herring appeared in large quantities at the end of April and remained in Pleasant bay and around the islands until the month of June. As the fishing vessels in the habit of calling for bait were not numerous in the spring, several fishermen could not find any buyer for their catches, and were not slow to put an end to their fishing operations. For some years herring smoking has been regularly carried on in that locality, and the product has been easily and advantageously sold.

In the counties of Gaspé, Bonaventure and Rimouski, herring was rather scarce.

The conclusions to be deducted from the above observations may be summed up by stating that in the Gulf Division, excepting the Magdalen islands, the fishing industry which was rather backward many years before the war and which had regained a little activity during the period extending from 1914 to 1919, has fallen again into a lamentable condition. Cod-fishing, indisputably the nucleus of the industry, is particularly affected by different causes against which our fish dealers and fishermen are not prepared to struggle. The latter always entangled in their old methods and processes, improperly equipped and only practicing their trade as a last resource till they can find less trying and more lucrative occupations, are moving in a body to some other fields of activity. This is rendered easy on account of the fact that numerous new industries have been established in the district, in which they are sure to find employment.

By taking into account the number of fishermen having thus given up their trade, and of those intending to follow the example of the former, since they are offering for sale at a low price their fishing tackle, apparatus and boats, not more than 50 per cent of the number of fishermen for 1919, will remain for the 1921 season's operations.

The patrol season on board the *Loos* closed without any accident. Foreign fishermen while not appearing in large numbers on the coast of Labrador and the Magdalen islands, complied with all the local regulations.

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## REPORT OF CHIEF INSPECTOR G. S. DAVIDSON, PRAIRIE FISHERIES DIVISION, FOR 1920

In consequence of the reorganization of the service which went into effect on April 1, my office was moved from Indian Head, Sask. to Winnipeg, and the province of Manitoba was added to the districts under my administration. Judging from the results of the reorganization from April to the present date, it promises success along the lines for which it was made. As in all new systems, certain difficulties have from time to time arisen, but these have adjusted themselves to a very great extent, and under the conditions now obtaining everything is working smoothly and gives every promise of increased efficiency. In a few districts, where no overseer has been employed, owing to the previously employed overseer resigning, the situation has been met by placing a special fishery guardian to act until a permanent appointment of an overseer has been made. There appears to be a lack of men qualified for the position

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of overseer, or who can qualify by passing the necessary examination. In all cases where special fishery guardians have been appointed returned soldiers have been given the preference.

In all three provinces there is a decrease in the catch. The past year has been most unfavourable for fishing operations. A very late spring shortened the fishing greatly at that season, a late fall delayed the formation of the ice on which operations are conducted in the winter until well into December, lack of snow made it impossible to reach the more distant points at which the most of the winter fishing is carried on, and a mild winter has reduced the operations, as it was not possible to be certain that the catch would keep in good condition, thereby limiting the catch.

On taking over the province of Manitoba I found that the regulations were not as well known or observed as could be wished and considerable difficulty was experienced in making it plain to the fishermen and some of the fish dealers that such a condition could not be allowed to continue. During the last three months a great improvement has been observed in this connection, it is simply a matter of treating the whole situation with firmness, and at the same time with justice and broad mindedness. I have every hope that in the near future I will have the co-operation of all fishermen in enforcing the regulations. I can say that I have had the fullest co-operation from all the larger companies conducting operations in the province and have found them willing to assist me in every way.

Inspector D. F. Reid died on September 2, after a lengthy illness, having been in the service of the department for a number of years. The vacancy made by his death has been filled temporarily by his son, Mr. C. F. Reid, who has given most acceptable service.

During the past year the sturgeon fisheries in the northern part of the province of Manitoba were opened to commercial fishing. It is, however, too early to give any definite opinion as to what may be expected of these fisheries; the catch not having as yet been brought out. Owing to lack of snow it was impossible for the fishermen to reach the fisheries until very late, so that no real estimate of their worth can be made at present.

The steamer *Bradbury* was employed on her usual work, placing buoys in lake Winnipeg, lighthouse work and taking care of the spawn at the different hatcheries, the late fall made it impossible for her to complete her work until much later than usual.

It is expected that in Alberta fishing for commercial purposes will be started at lake Athabasca during the coming summer. A cannery site has been procured by the Mackenzie Basin Fisheries, Limited, of Calgary, and I am informed that it is their intention to operate this year. This, however, depends entirely upon the question of transportation, which at present is very poor.

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REPORT OF CHIEF INSPECTOR, LIEUT.-COL. F. H. CUNNINGHAM,  
WESTERN FISHERIES DIVISION (BRITISH COLUMBIA), FOR 1920

The fishing season of 1920 was ushered in facing the entirely new policy of open fishing.

For many years there has been a restriction in the number of licenses which should be issued. This was one form of conservation by preventing intensive fishing in any one area. The number of applicants for fishing licenses had so increased that a change of policy became necessary, and to give every British subject an opportunity of entering the fishing business if he so desired, the restricted license policy was cancelled and the new policy of granting unlimited licenses to all British subjects of the white race and Indians took its place.

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For the purpose of seining licenses, the province was divided into twenty-one seining areas, for which a license was granted to fish in any portion of any one area. In the areas restricted to gill-net fishing, unlimited licenses were issued to the white race and Indians, and the number of licenses to be issued to other than the white race was restricted to the number operating during the season of 1919. This change in policy has practically eliminated all grounds for complaint that favouritism was shown in the issuing of licenses, and the new system appears to have met with the public approval.

With the advent of open fishing, it became necessary to look for some additional adequate conservation methods, and this was reached by placing fishing boundaries at the mouths of rivers inside of which no fishing was allowed, and further, the weekly close season was extended where conditions demanded, and in addition thereto, all fishing was stopped for the season on a given date in those areas where it was necessary to provide for an adequate supply of parent salmon on the spawning grounds.

Unfortunately, the market conditions for fall salmon were so limited that the pack of this commodity was greatly curtailed, and the total pack for 1920 of all species is 1,187,616 cases as compared with 1,393,156 cases for the season of 1919.

At the moment there is practically no demand for the fall varieties, and such demand as may exist is at prices which are below the cost of production. It is quite obvious that, to compete successfully in the markets of to-day, the cost of production must be largely reduced. One of the greatest competitors for the world's markets is the United States, where the raw material is produced much more economically than in Canada, under our regulations, which no doubt are more effective from a standpoint of conservation, but from the standpoint of competition are much more expensive.

A retrospect of the past fishing season is satisfactory so far as the run of fish to the various spawning grounds is concerned. The pack of 44,598 cases of sockeye for the Fraser river district is most encouraging, and in addition to this evidence comes in from all quarters that the spawning beds have been exceedingly well seeded. In fact, it is stated by J. P. Babcock, Esq., who has made a special study of the spawning grounds of the upper Fraser, that in no year since his knowledge of the Birkenhead river has he seen so many spawning sockeyes on the beds. This is most encouraging and satisfactory and tends to the optimistic views of many that the Fraser river will again come back to its former productiveness.

Of course, it must not be overlooked that fishing operations in Puget sound were limited; there being very few purse-seines operating in that area, and if the Puget sound operators are honest in their desire to assist in the building up of this river, restricted fishing must be practised by them for several years. Whilst south of the border, traps and purse-seines are allowed, nearly 500 purse-seines operating in 1917—in addition to nearly 200 traps, no sockeye are caught on the Canadian side of the line except by gill-nets, apart from six traps on the southwest shore of Vancouver island opposite to the American waters.

It is pleasing to refer to the large pack of sockeye at Rivers Inlet. One hundred and twenty-one thousand two hundred and fifty-four cases were packed, and a large number of fish were exported to canneries outside the Rivers Inlet area. This pack comes well up to the big one of 1915, when 130,000 cases resulted from the season's operations.

The one disappointing area in District No. 2 is the Naas river, where only 16,740 cases were put up, as compared with the normal pack of some 30,000 cases. It is maintained by the operators and fishermen that the American traps, operated in American waters, are taking sockeye headed for the Naas river and are thus depleting the run. This phase of the question is receiving the attention of the authorities both at Ottawa and Washington, and it is hoped that, if conditions are as stated, a solution will be found before it is too late.

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The run of sockeye to Rivers Inlet and Smith's Inlet was beyond all expectations and both fishermen and operators were more than satisfied with the results. It is also reported that the spawning beds of this area were seeded to capacity. As you are aware, no fishing of any kind was allowed in Quashela creek or Wyclese lakes—consequently after the salmon entered Quashela creek they had free access to their spawning grounds.

Conditions in District No. 3, from a canning standpoint, were very unsatisfactory. With the exception of two canneries located in the vicinity of Victoria and one at Alert bay, all canneries in this district have to rely practically on fall fish—and as a consequence the pack is 179,196 cases less than in 1919. There were eleven canneries in this district which could not operate owing to market conditions for fall salmon. This effect was most noticeable on the west coast of Vancouver island, where large catches of chums obtained in 1919, the fishing of 1920 being negligible. The limited operations were due entirely to market conditions and not to a scarcity of salmon, as on the whole there was a splendid run of all salmon indigenous to the waters of District No. 3.

The removal of obstructions from salmon streams has been carried on energetically throughout the whole summer by Engineer McHugh and his assistant, Mr. Hunt.

This work is most necessary and of great value. All the streams in the Owekayno Lake district were cleaned out, the Atnarko river at Bella Coola was greatly improved at a heavy expenditure; a number of streams in the Quathiaski Cove district were attended to—as well as others on the east coast of Vancouver island, and as a result, the fish now have unobstructed passages to their spawning grounds at all these points.

The past season has been a most important and fruitful one from the standpoint of improving the quality of the pack, especially that of the fall fish—pinks and chums. It must be remembered that during the years of the war, the slogan was "the greatest production in a limited time"—consequently the pack of salmon put up at the end of the season may not have been equal in quality to the production of former years, but this is not a single instance, as all lines of goods manufactured suffered in the same way from greater production.

The salmon industry now realizes that the former high standard of quality of the salmon pack in British Columbia must again be attained, and with this object in view many conferences were held to discuss ways and means. It is felt that rigid inspection, either at the canneries or after the pack has been processed, is necessary to reach the desired end.

Many views were expressed, but whilst there is agreement as to the need for continued inspection, it is an open question as to whether this should be an inspection of the fish at the canneries or after they are in the cans.

It was finally concluded that the inspection of the fish before being processed in the cannery and of the sanitary conditions under which operations are carried on should only be attempted as at present, and that the provisions of the Meat and Canned Foods Act be rigidly enforced by the officers of the department.

This is valuable so far as it goes, but it is felt that it should go further and provide for full inspection of canned goods by Government inspectors, whether the product is intended for home or foreign consumption. Both the home and foreign markets desire goods of the highest quality, and if the markets for fall salmon are to be brought back to their former magnitude, the public must be educated up to the fact that in purchasing a can of any species of salmon packed in British Columbia, it can be relied upon, and they are purchasing the best that can be produced in any country.

It is pleasing to refer to the visit of the Hon. C. C. Ballantyne, Minister of Marine and Fisheries, to the coast. Such a visit gave the opportunity for obtaining

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first-hand knowledge on fishing conditions as they exist in this province. It brought him in touch with all phases of the industry, as he met canners, fishermen and Government officials, and it is felt his visit will be of great value, both in administration and development.

Those interested in the fisheries of the province were also fortunate in having a visit by the Assistant Deputy of Fisheries, Mr. W. A. Found, who made a thorough inspection of all the fishing grounds covered from the boundary line in the south to the boundary line in Portland canal, as well as the west coast of Vancouver island. Meetings with canners and fishermen were held at several points, and many questions tending to the betterment of the industry were discussed and considered.

There is one question which has been the subject of regret extending from the Atlantic to the Pacific, and which is that there is no separate Department of Fisheries administered by an officer having the full authority of a deputy minister. This matter has been urged on the Government for years as a means by which this great national asset would be open to still greater development and improved administration. The additional cost would be nominal, as the Fisheries Branch has the equipment and officials necessary for a department, the only missing link being the deputy minister.

Coming to the question of fish culture, there has perhaps been, at no time in the history of the fisheries, such an interest taken in this work by the industry generally and the public at large, as at the present time. Columns have appeared in the press giving views and ideas as to how this branch of the service could be improved. Comparisons of the system in vogue in British Columbia as compared with the system in certain states of the Union have been made, and yet it has not been possible to bring forward any definite proof that the Canadian system does not give just as good results as the systems of other countries. It is the desire of the department and its officials to experiment in any direction which may tend to increase the results.

The present system has given splendid results. This is borne out by the fact that in whatever locality artificial fish culture is conducted, the run of salmon is normal—notwithstanding the increased fishing operations.

Public opinion is in the direction of retaining ponds in which fry can be held, especially sockeye, until they are one year old, when they will be liberated to follow nature's course.

Arrangements have been made to increase this system in connection with the Canadian hatcheries, and the season of 1921 will see retaining ponds at all the hatcheries in British Columbia, where the necessary facilities exist for constructing the same.

The success met with at the Oregon hatchery, located at Bonneville, has been referred to on many occasions, and there is no doubt that splendid work has been accomplished. It must be pointed out, however, that the locations of the British Columbia hatcheries do not offer the same facilities as Bonneville. In British Columbia we are subjected to tremendous freshets, which carry everything before them. The Bonneville hatchery is located on the railway, which provides adequate facilities for the transporting of food supplies. There is a steady supply of good water, which is not subjected to freshets at any season of the year.

The hatcheries in this province are located as close to the natural spawning grounds as possible and are consequently isolated and far removed from railway connection, and, in several instances, long distances from the steamboat routes—consequently the question of food for the young fish is a vital one and will require careful consideration and heavy expenditure.

In any event, every effort is being put forward in the desired direction, and every official connected with fish culture is taking up the question with the one desire of successful results.

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Mr. J. A. Rodd, the Superintendent of Fish Culture, made an inspection of all the hatcheries during the month of June, and went thoroughly into all the different methods attempted at the various hatcheries—such as the hatching of eggs in gravel, retaining ponds, and etc. He made suggestions at various places which no doubt will tend to improve conditions.

This officer also represented the department at the Canadian Fisheries Convention held in Vancouver. At this convention there were representatives of the whole Canadian fisheries, as well as visitors from the United States, who submitted papers on certain conditions of the fishing industry and the artificial incubation of fish life.

The convention was a wonderful success, and whilst good work was done by President A. H. Brittain and by every member of the association, it is pleasing to note that at the expiration of Mr. Brittain's term of office he was succeeded by a British Columbian in the person of Mr. A. L. Hager.

In closing, I may say that this will be the last report submitted by me as Chief Inspector of Fisheries for the province of British Columbia, as my retirement from the service dates from the 31st instant.

To the officers engaged in the administration of the fisheries and fish culture in the province of British Columbia I wish to convey my highest appreciation of the loyalty and valuable services they have given, and I feel assured that the same efficiency will be extended to my successor in office.

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## APPENDIX II

LIST of United States Vessels which entered Canadian Ports on the Atlantic Coast  
during the Year ended December 31, 1920

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Acushla.....	70	25	12
Adeline.....	50	19	4
Agnes.....	65	18	4
Albata.....	20	7	1
Albert D. Willard.....	23	8	5
Alice M. Doughty.....	15	8	10
Angeline C. Nunan.....	58	13	4
Angie B. Watson.....	36	18	2
Arthur James.....	95	19	1
Athlete.....	96	25	5
Athens.....	56	17	1
Avalon.....	69	21	11
Bay State.....	81	25	11
Benjamin A. Smith.....	95	23	10
Benjamin W. Wallace.....	49	19	1
Catharine.....	103	22	6
Catharine Burke.....	68	19	13
Cavalier.....	96	20	5
C. E. Hopkins.....	44	16	1
Chelwina.....	16	6	1
Constellation.....	89	19	7
Corinthian.....	97	25	10
Cora Wells.....	13	5	1
Curlew.....	209	27	3
Dawn.....	79	21	4
Edith Silveria.....	47	16	3
Eleanor.....	36	9	5
Elizabeth A.....	12	9	10
Elizabeth N.....	102	23	4
Elizabeth and Ruth.....	38	17	10
Elizabeth W. Nunan.....	48	17	1
Eliza L. Spurling.....	49	19	1
Elk.....	66	23	3
Ellen and Mary.....	97	23	1
Ellen T. Marshall.....	75	23	8
Elmer E. Gray.....	71	20	7
Esperanto.....	91	22	5
Ethel B. Perry.....	56	15	1
Etta Mildred.....	45	16	1
Fannie Belle Atwood.....	81	16	2
Fannie E. Prescott.....	74	20	5
Flora L. Oliver.....	59	19	8
Flora.....	72	19	1
Frances S. Grueby.....	94	25	5
Funchal.....	20	8	6
Genesta.....	53	20	5
Gleanor.....	23	7	8
Good Luck.....	55	19	14
Grebe.....	203	28	1
Harmony.....	66	19	13
Harvard.....	72	19	3
Hazel R. Hines.....	79	21	9
Helena.....	40	17	1
Helja Silver.....	77	21	1
Henry L. Marshall.....	42	16	2
Herbert Parker.....	78	23	7
Heroine.....	149	21	2
Heron.....	208	26	1
Hesperus.....	79	25	12
H. Horton.....	34	12	1

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LIST of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the Year ended December 31, 1920—*Continued.*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Higco.....	12	7	1
Hortense.....	43	18	2
Imperator.....	79	25	9
Ingomar.....	85	23	3
James R. Clark.....	36	18	3
Jeanette.....	51	18	7
John A. Casey.....	14	7	1
John A. Cooney.....	36	9	7
John J. Fallon.....	60	19	3
Joseph Warren.....	11	7	13
John D.....	12	6	9
Josephine D. Costa.....	84	22	2
Joffre.....	80	25	11
Judique.....	80	7	1
Julietta.....	26	4	4
Killarney.....	73	23	12
Kineo.....	71	19	3
Lafayette.....	12	17	6
Laverna.....	95	22	1
Leonora Silveria.....	51	19	10
Louisa R. Silva.....	92	22	8
Lucia.....	43	17	4
Margaret.....	72	19	4
Mary de Costa.....	62	17	4
Mary E. Harty.....	77	18	5
Mary F. Fallon.....	46	15	2
Mary F. Curtis.....	65	19	6
Marshall Foch.....	64	23	9
Mary V. Goulart.....	66	25	2
Margaret and Ruth.....	77	20	1
Malte.....	17	9	1
Malicia Enos.....	8	5	10
Mildred Robertson.....	73	19	13
Minerva.....	13	6	6
Monarchy.....	83	19	5
Morning Star.....	85	22	7
Morten.....	17	9	1
Motor.....	17	9	5
Natalie Hammond.....	57	21	2
Nickerson.....	23	8	7
Nirvana.....	50	12	9
Nyoda.....	28	12	1
Osprey.....	169	27	1
Phillip P. Manta.....	43	18	3
Pioneer.....	128	22	1
Plover.....	208	27	1
Pollyanna.....	66	19	5
Ralph Brown.....	75	23	1
Reliance.....	22	7	4
Republic.....	43	19	10
Rex.....	75	23	11
Richard J. Nunan.....	55	17	10
Rita A. Viator.....	22	9	9
Romance.....	96	24	3
Ruth.....	49	17	9
Russel.....	66	22	1
Ruth and Margaret.....	77	23	8
Ryena.....	6	6	2
Sadie M. Nunnan.....	36	9	8
Sheldrake.....	208	28	1
Stilletto.....	91	19	2
Squanto.....	81	17	10
Sunapee.....	18	9	4
Teazer.....	59	19	10
Teal.....	209	27	1
Thelma.....	52	12	2
T. M. Nicholson.....	90	11	5
Togo.....	14	6	1

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LIST of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the Year ended December 31, 1920—*Concluded.*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Victor.....	75	19	4
Viking.....	34	18	5
Vida McKeown.....	83	20	4
Waltham.....	44	17	3
Waldo L. Stream.....	81	21	7
Walrus.....	246	26	1
W. H. Reid.....	9	6	8
Widgeon.....	205	28	2
Wild Goose.....	209	28	1

LIST of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
A. & R.....	5	2	1
Ace.....	4	1	1
Acushla.....	10	3	1
Adele.....	5	2	1
Adeline.....	16	3	21
Agnes.....	17	5	3
Alaska.....	55	15	11
Albatross.....	40	13	35
Alf.....	9	2	2
Alfa.....	12	5	11
Alton.....	43	15	13
Altree.....	43	15	2
Alice B.....	13	5	5
A. M. Nixon.....	29	11	1
America.....	25	11	18
Angelus.....	4	3	1
Anise.....	3	2	3
Anna.....	5	4	1
Anna J.....	22	5	4
Annie.....	11	4	2
Apex I.....	15	4	1
Arctic.....	29	4	12
Arcadia.....	14	4	9
Arrow.....	4	2	1
Atica.....	12	3	2
Atlas.....	31	11	9
Atlantic.....	25	11	6
Augusta.....	19	5	5
Aurora.....	13	5	9
Baltic.....	20	5	3
Barnot.....	3	2	1
Bartalome.....	4	3	12
Bear.....	4	2	1
Beaver.....	9	4	14
Behring Sea.....	44	5	1
Bell.....	4	2	2
Betty.....	4	3	1
Bill R.....	39	6	1
Blue Sea.....	12	23	1
Blue Bird.....	4	1	3
Bravo.....	4	2	16
Bring Gold.....	12	5	10
rothers.....	13	5	8

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LIST of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920—*Continued*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Bruce.....	2	2	1
Buddy.....	34	5	1
Ceaser.....	8	2	1
Carmen.....	28	7	2
Cape Spencer.....	11	4	10
Cape Clear.....	13	4	1
California.....	20	3	1
Castle.....	4	2	5
Carolene.....	18	5	10
Castor.....	6	3	2
Cedric.....	7	2	1
Celt.....	29	6	1
Charlotte.....	4	2	1
Chancellor.....	13	5	11
Chimawa.....	2	2	1
Chimera.....	9	3	2
Christina.....	4	2	3
Clanex.....	12	4	1
Clara.....	10	2	9
Commonwealth.....	60	18	1
Commander.....	22	3	1
Companion.....	5	4	1
Confidence.....	22	4	2
Constitution.....	39	15	9
Convention.....	20	5	19
Cora.....	4	2	9
Corona.....	19	11	7
Crescent.....	14	5	11
Dague.....	4	1	1
Daily.....	25	5	12
Daisy.....	18	8	11
Deceiver.....	17	5	1
Defence.....	20	5	6
Democrat.....	27	6	8
Diamond T.....	8	2	6
Dick.....	10	5	4
Dime.....	6	1	1
Director.....	12	4	10
Doll.....	4	1	1
Dolly Dimple.....	4	3	1
Duce.....	6	1	1
Eagle.....	27	5	18
Eastern Point.....	4	3	16
Fidsvold.....	15	5	19
Einer Beyer.....	92	7	2
Elco.....	5	2	3
Eleanor.....	16	5	3
Elfia.....	5	2	1
Ellen.....	4	3	1
Ellen W.....	6	1	1
Elma.....	4	2	2
Elmira.....	4	2	1
Eloaese.....	8	2	2
E. L. Ray.....	7	3	1
Elsie.....	14	4	7
Elsinore.....	23	3	1
Emily.....	4	2	1
Emblem.....	4	3	1
Enrich.....	5	2	1
E. Neilson.....	15	5	5
Ethelyn.....	4	2	2
Eureka.....	5	2	1
Evening Sun.....	3	1	2
Evolution.....	17	5	15
Fairway.....	19	5	10
F. C. Hergert.....	15	6	8
Fighting Bud.....	4	2	1
Fisher.....	14	5	25
Flamingo.....	13	5	13

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LIST of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920—*Continued.*

Name of Vessel.	Tonnage.	Number of Men. in Crew.	Number of Times Entered.
Flattery.....	10	4	5
Fordenskjola.....	39	13	3
Fortescu.....	21	5	1
Fortuna.....	21	5	11
Forward.....	18	5	2
Foss No. 6.....	12	1	1
Fram.....	4	3	5
Frances M.....	4	2	2
Frances R.....	9	3	1
Genfurco.....	5	2	1
Gjoa.....	13	4	2
Glacier.....	12	4	12
Goney.....	12	5	10
Grant.....	5	2	2
Grayling.....	16	5	16
Gypsy.....	4	1	2
H. & R.....	4	3	23
H. B. Jones.....	23	7	2
Happy.....	12	4	2
Harder.....	8	3	2
Harvester.....	15	5	7
Hattie B.....	6	2	1
Hazel.....	7	4	1
Hazel H.....	25	5	5
Hecla.....	6	2	3
Helen.....	3	2	1
Helena.....	15	5	14
Helen D.....	8	3	6
Helegeland.....	56	15	9
Hesperus.....	5	4	1
Hilda.....	10	3	9
Hi Gill.....	4	3	1
Holdal.....	4	3	8
Home.....	9	3	1
Honey Boy.....	6	1	1
Hope.....	3	1	8
Hulda.....	6	3	2
Hutch.....	4	1	1
Ictus.....	5	2	1
Idaho.....	6	2	1
Imperial.....	23	5	8
Inger.....	7	2	1
Iris.....	2	1	1
It.....	5	1	1
J. A. G.....	8	2	1
Jean.....	9	4	4
Jennie.....	16	2	5
Jennie F. Decker.....	16	8	17
Joker.....	5	2	3
Johanna.....	15	5	13
J. P. Todd, I.....	4	2	4
J. P. Todd, II.....	12	4	3
Jugo Slav.....	33	3	1
June.....	9	4	4
Kasann.....	28	5	1
King and Wing.....	97	23	11
Kodiak.....	38	13	14
Kyak.....	8	3	12
K. 18.....	4	1	1
K. 225.....	3	2	3
K. 227.....	5	1	2
K. 619.....	4	2	1
Lansing.....	16	4	13
Lapaloma.....	44	11	6
Laura.....	7	2	4
Lawrence P.....	13	10	1
Lebanon.....	14	5	11
Leif.....	21	4	2
Lenore.....	14	4	3

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LIST of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920—*Continued.*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Leo.....	6	3	1
Leonine.....	24	4	1
Leonora.....	3	2	2
Liberty.....	44	15	25
Lilly.....	3	1	2
Lincoln.....	28	5	12
Little Jack.....	40	5	1
Livingstone.....	24	6	8
Louise.....	16	5	10
Lovera.....	4	2	6
Lubra.....	13	5	1
Lumen.....	10	4	12
286. L.....	5	1	1
Mabel A.....	22	5	8
Mabel C.....	4	2	1
Mackeral.....	8	3	10
Madeline J.....	21	5	8
Maghuel.....	6	3	1
Margaret F.....	10	4	4
Mars.....	9	4	9
Martha.....	7	4	1
Margaret.....	37	4	1
Mary.....	16	8	3
Mary B.....	22	5	1
Mary N.....	4	1	1
May.....	4	2	3
Memories.....	8	2	1
Mermaid.....	19	5	12
Mildred.....	19	8	12
Mira.....	4	3	7
Mobile.....	4	1	1
Mololo.....	9	11	18
Morengen.....	17	5	2
Myrtle.....	9	5	18
Narada.....	42	6	3
National.....	20	5	8
Nellie C.....	5	2	1
Neptune.....	3	2	1
New England.....	70	28	4
Niagara.....	13	3	3
Nidaross.....	13	5	25
Nip.....	4	2	2
Nomad.....	15	5	12
Norland.....	19	5	6
Nordby.....	9	5	1
Norma.....	6	3	14
North.....	9	3	14
North Cape.....	4	3	1
North Sea.....	5	1	2
Northland.....	4	2	4
Nule.....	6	2	1
Ocean Wave.....	10	6	1
O. K.....	7	2	1
Olympic.....	30	11	7
Omaney.....	34	13	8
Onah.....	18	5	14
Orient.....	48	15	12
Osborne.....	10	2	2
Pacific.....	16	11	13
Pagebie.....	10	2	1
Panama.....	34	13	13
Papoose.....	3	2	1
Pauline.....	14	5	11
Pershing.....	18	15	11
Peerless.....	24	1	1
Pioneer.....	48	15	9
Pioneer III.....	26	5	7
Pirate.....	20	14	1
Polaris.....	45	15	9

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List of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920—*Continued.*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Pollyanna.....	6	2	1
Preslio.....	17	5	7
President.....	24	6	4
Prim.....	4	2	1
Primrose.....	3	1	1
Progress.....	5	3	8
Prospector.....	50	7	3
Puffin.....	18	6	1
Quadra.....	29	6	1
Rainer.....	4	4	7
Reform.....	4	4	1
Reliance.....	14	4	17
Reliance I.....	19	5	22
Republic.....	51	15	10
Restitution.....	24	5	16
Retriever.....	7	3	2
Riald.....	12	2	1
Ronald Amunsden.....	15	5	7
Roamer II.....	4	2	1
Rolie.....	10	4	2
Romane.....	8	2	1
Roosevelt.....	13	5	10
Rosario.....	16	5	11
Royal.....	15	5	5
Ruth.....	10	3	1
Ryal.....	4	2	1
S. & S.....	4	2	2
Sadie.....	4	2	2
Sadie K.....	13	5	2
Salmona.....	20	5	3
Saltern.....	4	2	4
Sammy.....	8	3	1
Samson.....	7	2	11
Sands.....	4	2	1
Santa Rita.....	15	2	1
Scandia.....	79	17	9
Scout.....	5	2	2
Seahome.....	3	3	1
Sealion.....	6	2	3
Seattle.....	55	15	11
Searchlight.....	7	5	1
Senator.....	11	11	8
Sentinel.....	21	6	4
Seymour.....	44	15	7
Shamrock.....	21	3	12
Sherman.....	18	5	7
Signal.....	13	12	2
Siloam.....	16	5	13
Sitka.....	50	16	12
Sokol.....	7	2	3
Sophia Johnstor.....	46	5	1
Speculator.....	9	4	15
Spencer.....	17	5	10
Star.....	12	4	8
Starlight.....	35	5	1
Starling.....	14	6	1
Success.....	4	3	2
Sumner.....	34	15	8
Sunland.....	26	11	1
Sun Wing.....	15	5	8
Superior.....	16	5	9
Swiftsure.....	22	5	12
Tahoma.....	18	11	11
Tarar.....	4	1	1
Tatoosh.....	24	6	12
Teddy J.....	13	5	7
Texas.....	16	5	20
Thelma.....	3	2	2

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List of United States Vessels which entered Canadian Ports on the Pacific Coast during the Year ended December 31, 1920—*Concluded.*

Name of Vessel.	Tonnage.	Number of Men in Crew.	Number of Times Entered.
Thelma II.....	26	5	7
Thelma M.....	7	2	1
Thor.....	4	2	2
Tillicum.....	21	5	12
Tip Top.....	9	2	2
Tom and A II.....	57	15	11
Topsy.....	6	2	2
Tordenskjold.....	39	13	8
Trio.....	19	5	1
Trip.....	19	5	1
Tyee.....	89	20	10
Tzartoos.....	22	6	2
T. 810.....	5	1	1
T. 840.....	4	2	1
T. 865.....	3	4	1
T. 981.....	5	1	3
Uncle Salmon.....	32	4	13
Unimak.....	10	3	1
Uranus.....	15	5	11
Valden.....	10	10	1
Valid.....	8	3	13
Vamoose.....	16	3	1
Vancee.....	43	15	5
Ventura.....	5	2	4
Venus.....	25	8	14
Verbus Units.....	10	5	1
Verdun.....	8	2	1
Vesta.....	13	4	18
Victor.....	8	3	2
Victory.....	5	1	1
Viga.....	17	5	1
Viking.....	8	3	17
Vinland.....	4	2	4
Vivian.....	5	2	4
Volunteer.....	19	6	5
Washington.....	24	11	2
Wave.....	7	3	2
Westfjord.....	17	5	13
Whitestar.....	17	4	5
Whitman.....	26	5	1
Wildwood.....	13	2	7
Wilhelmira.....	17	5	10
Wilson.....	19	5	13
Wireless.....	17	5	15
Woodrow.....	23	5	1
W. 6.....	26	4	1
Yakutat.....	41	13	16
Yellowstone.....	22	6	10
Yes Bay.....	75	8	2
Yule.....	6	2	1
Zilla May.....	55	15	15

## APPENDIX III

REPORT OF FISHERIES ENGINEER CHARLES BRUCE ON FISHWAYS  
IN THE MARITIME PROVINCES, 1920

I beg to submit the following report on the condition of fishways in the various dams on rivers in the Maritime Provinces.

## NOVA SCOTIA

*Yarmouth County.*—A fishway constructed by the town of Yarmouth in a small dam at the head of Yarmouth harbour, was completed during the summer, and is reported by the Overseer to be in an excellent and effective condition.

The changes to be made in the fishway in the Carleton power dam were not done this year as the alterations to the power plant were not completed.

*Shelburne County.*—A fishway was constructed by the Clyde Pulp Company in a low dam built during the summer on the Clyde river.

*Queens County.*—The fishways in the three lower dams on the Mersey river were repaired and a new one built in the fourth dam by the department. A new fishway was built in the fifth dam by the town of Liverpool. Enquiries to secure evidence that salmon were taken on the rod above these dams shortly after completion of the fishways as was reported, have up to this date not been replied to. It is probable that definite information will not now be available until next spring's run of fish enters the river.

The fishway built during the fall of 1919, in the Pulpmill dam on the Medway river, proved quite successful, large numbers of both salmon and alewives being taken above the dam during the past summer. This fishway, which was constructed of concrete, suffered some damage due to the fact that water was allowed to pass through it before the concrete was thoroughly hard. Repairs were made by the Pulp Company.

*Lunenburg County.*—Inspections were carried out on both the Lahave and Mush-a-mush rivers.

In the former the fishway in the second dam, owned by the Davidson Lumber Company, was considerably damaged by freshets during the spring. The company was making repairs to the dam and providing for complete repairs to this fishway.

The inspection of the Mush-a-mush showed that eleven dams exist all but three of which were equipped with fishways. The owners were served with notices to build fishways in these, but owing to a shortage of cement the work was not brought to completion this fall. On three of the existing fishways certain repairs were ordered in order to make them more efficient.

*Halifax County.*—As the fishway in the dam on the Musquodoboit river had become inefficient, due to the leaky condition of the dam itself, a portion forty feet long was removed from the dam to allow the free ascent of fish.

*Guysboro County.*—A fishway was built by the owners in a dam on the Salmon river, and is reported to be in good and efficient condition.

An opening has been made in the Isaac Fisher dam on the Antigonish branch of the St. Mary's river to admit the ascent of fish.

*Colchester County.*—A new fishway was built by the owners in their dam on the Economy river, which is reported to be in good and efficient condition.

An opening was made in a small dam on the Bass river owned by the Dominion Chair Company, to admit the free passage of fish.

## SESSIONAL PAPER No. 40

*Cumberland County.*—A new fishway was built by the owners in their dam on the east branch of the Apple river. This is reported to be in good and efficient condition, and the overseer states salmon have been seen some distance above the dam.

*King's County.*—A fishway was completed by the owners in their dam on the Gaspereaux river. This dam is thirty feet high, and the phenomenal success of the fishway for the ascent of alewives, literally thousands having passed through it, is considered as deserving of note. Previous to the construction of this fishway the highest dam, in which a successful fishway was in operation, was one in a dam on the Kouchibouguac river in New Brunswick, having a height of twenty feet. Owing to changes being made at the power plant during the summer and fall, as well as an extremely dry season, the water was very low, so that it is doubtful if any salmon succeeded in ascending the fishway. There does not appear any reason, from a structural viewpoint, why they could not do so, and it is hoped after the company completes the power construction so that final conditions can be determined that a rearrangement of the lower entrance of the fishway may remedy conditions.

*Annapolis County.*—The fishway in the dam on the east branch of the Bear river was rebuilt by the owners during the summer, the old structure having been in a poor state of repair. The new structure is reported to be in a good and effective condition. The fishway in the dam on the Lequille river, owned by the town of Annapolis, was repaired during the summer. These repairs were not carried out strictly in accordance with the department's instructions, but during an interview with the commissioner of lights for the town, he gave evidence that trout had been seen in the fishway at several points on its course. One of the chief difficulties to contend with on this river is that the flowage is so small during the greater part of the season that the electric power, in order to operate at all, drains the water below the upper entrance of the fishway. The town is building a storage dam further up the river to prevent this condition, and it is hoped this will tend to materially improve matters so far as the operation of the fishway is concerned.

A fishway was completed during the summer of 1919 in the dam on the Annapolis river at Lawrencetown. The department was confronted with a serious problem at this dam, in that the Annapolis is one of the few rivers on the Atlantic coast frequented by shad for spawning purposes, and, so far as it was aware, no successful fishway for the use of this fish was known. The dam is approximately five feet high with water at normal level. When this dam was built plans of a fishway to be constructed of wood were prepared and submitted to the owner. In building the fishway he departed from the plans, with the result that no shad ascended the river during the season of 1919. The matter was again taken up and it was decided, in rebuilding, to avoid wooden construction, and to cater as far as possible to the timid habits of the shad by so constructing the fishway that it would appear as a natural channel. In order to determine a safe grade for the fishway a study was made of the "rips" which occur below the dam, up which it was known shad had passed in large numbers. The fishway was then laid out and built according to the plans attached. The "rips" above referred to showed a grade of approximately one in fifteen, which was adopted as a maximum for the fishway. No partitions other than stone projections to retard the continuous flow somewhat were put in. These projections not only retarded the flow, but formed a deadwater below in which the shad could rest before ascending further. A width of not less than eight feet was maintained throughout, wider portions shown being due to the natural contour of the ground admitting of such without excessive work.

A condition which made construction at this place somewhat difficult was the fact that the material in excavations was entirely of clay and quicksand. Excavations were carried well back and faced with stone walls and the floors paved to prevent erosion. In spite of these precautions, a short time after the water was turned

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through it gullied out at the bend where the direction is changed and had to be filled in with heavy stone.

In the spring of 1920 when the shad entered the river a close observation was made at the fishway, and during one hour upwards of fifty were seen to pass through and into the pond above. Later evidence was secured that these fish had reached the spawning grounds. Salmon and trout also ascend this fishway.

## NEW BRUNSWICK

*Westmorland County.*—During the summer of 1919 fishways were built in the Jones dam on the Petitcodiac river, in a dam owned by the Salisbury Lumber Company on the Coverdale river, and in the Jordan Sanatorium dam on the Pollet river, both these latter rivers being tributaries to the Petitcodiac.

In the summer of 1920 a fishway was built in the S. H. White dam on the Pollet river.

All of these fishways are reported to be efficient, so that the situation so far as this system of rivers is concerned is to be considered very satisfactory.

*Charlotte County.*—An opening was made by the owners in an unused dam on the New river which admits of salmon and other fish ascending to the spawning grounds.

An inspection was carried out at the falls on the Magagnadavic river at St. George, a report on which has already been submitted.

In general it may be said that the efforts of the department along these lines have been marked with a good measure of success. A number of problems will engage attention next year. It is desired to point out that the design of an efficient fishway constitutes an individual problem in each locality. No two dams present similar conditions, and quite frequently the conditions are not favourable owing in some instances to natural conditions and in others to the fact that the owners of dams have built them in such a manner that the placing of a fishway is practically impossible.

**MARINE & FISHERIES DEPT.**  
**FISHERIES BRANCH**

**ANNAPOLIS RIVER N.S.**

**PLAN OF A DAM  
AT LAWRENCETOWN  
showing fishway**

Date Feb 18 1921  
C. Bruce  
Engineer

Large number depending  
on height of water

**HIGH BANK**

**FISHWAY**

**NOSE OF BANK**

**STILL WATER.**  
DEPTH FROM 4 TO 10 FT.

**RIVER.**

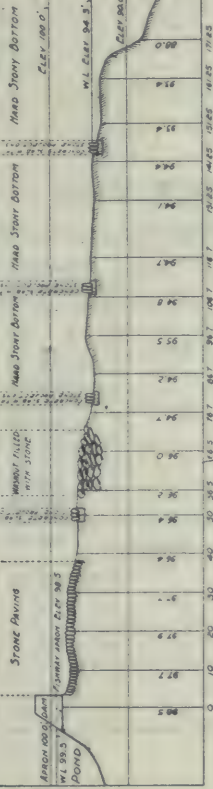
**RIDGE  
OF  
LOOSE STONES**

**RIPS.**

**ELEV. OF WATER  
94.3**

**APRON  
ELEV. 99.3**

**PROFILE OF FISHWAY**



**POND.**

**APRON - ELEV. 100.0'**

**ELEV. OF WATER 93.3'**

**RIVER.**

**FLUME.**

**POWER  
HOUSE**

**WASTE GATE.**

## APPENDIX No. IV

## FISHERIES EXPENDITURE, 1920-21

	Appropriation.	Expenditure.
	\$ cts.	\$ cts.
Salaries and disbursements, Fishery Officers.....	710,000 00	709,449 34
Fisheries Patrol Service.....		
Oyster Culture.....	365,000 00	364,789 43
Fish breeding.....	25,000 00	15,622 18
Conservation and development of the deep sea fisheries.....	40,000 00	38,620 29
Building fishways and cleaning rivers.....	4,000 00	455 56
Legal and incidental expenses.....	5,000 00	1,500 88
Fisheries Intelligence Bureau.....	15,000 00	6,165 59
Inspection of canned and pickled fish.....	26,000 00	26,000 00
Marine Biological Board.....	15,000 00	4,690 11
Scientific investigations into fisheries.....	10,000 00	
International Commission—Fraser River.....	60,000 00	43,643 79
New patrol boats.....	21,645 55	21,645 55
Expenses Quebec Fisheries Reference.....		
	1,296,645 55	1,232,582 72
Fishing Bounty.....	160,000 00	152,519 30
	1,456,645 55	1,385,102 02
Unforeseen expenses.....		593 20
Cost of living bonus.....		85,599 61
Miscellaneous—gratuities.....		890 00
Reclassification of salaries.....		36,740 23
Totals.....	1,456,645 55	1,508,925 06

## FISHERIES REVENUE, 1920-21

Licenses, Fines and Sales.	Amounts Collected.	Refunds.	Net Amounts.
	\$ cts.	\$ cts.	\$ cts.
Nova Scotia.....	12,189 62		12,189 62
Prince Edward Island.....	3,720 12		3,720 12
New Brunswick.....	15,170 52		15,170 52
Quebec.....	6,540 15	3 25	6,536 90
Ontario.....	2,053 25		2,053 25
Manitoba.....	11,798 99	5 00	11,793 99
Alberta.....	8,698 75	5 00	8,693 75
Saskatchewan.....	4,082 30	5 00	4,077 30
British Columbia.....	239,102 04	5,820 00	233,282 04
Yukon.....	280 00		280 00
	303,635 74	5,838 25	297,797 49
Casual Revenue.....			7,362 44
Fish Breeding Revenue.....			13,295 89
Revenue under Pelagic Sealing Treaty.....			185,748 07
Premiums on exchange.....			24,560 59
Total.....			528,764 48

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## APPENDIX No. V

The following is a statement showing the number of Licenses of the different kinds, issued in EACH PROVINCE during the 1920-21 Season:—

Kind of License—	QUEBEC.	No. Issued.
Lobster Packing.....	71	(2 cancelled).
Lobster Extensions, 19.....		
Fish Cannery.....	6	
Lobster Fisherman's.....	627	
Salmon Fishery.....	155	(2 cancelled and 1 free).
Herring Trap-Net.....	41	
Cod Trap-Net.....	272	
Receipt Books, 242 (1 can.).....		
Rental of Salmon Fishing Privileges in the estuary of St. John River, 1.....		
	1,172	(4 cancelled and 1 free).
PRINCE EDWARD ISLAND.		
Lobster Packing.....	186	
Lobster Extensions, 120.....		
Quahaug.....	4	
Fish Cannery.....	14	
Lobster Fisherman's.....	1,880	(6 cancelled).
Oyster Fishery.....	224	(1 cancelled).
P.E.I. Trap-Net.....	3	
Smelt Gill-Net.....	201	
Smelt Bag-Net.....	230	(1 cancelled).
	2,742	(8 cancelled).
NOVA SCOTIA.		
Lobster Packing.....	165	(1 cancelled).
Lobster Extensions, 146.....		
N.S. Angling Permits.....	353	
Fish Cannery.....	15	
Lobster Fisherman's.....	8,258	(5 cancelled).
Smelt-Gill Net.....	273	
Smelt Bag-Net.....	218	
Oyster Fishery.....	150	(1 free).
N.S. Trap-Net.....	207	(2 cancelled).
Trap Net Extensions, 1.....		
N.S. Salmon Net.....	20	
N.S. Drag Seine.....	177	
N.S. Herring Weir.....	33	
Scallop Fishery.....	173	
Lobster Pound Licenses.....	8	
Lobster Pound Certificates, 326.....		
	10,100	(8 cancelled and 1 free).
NEW BRUNSWICK.		
Lobster Packing.....	184	
Lobster Extensions, 46.....		
Fish Cannery.....	7	
Lobster Fisherman's.....	2,104	(5 cancelled).
Scallop Fishery.....	10	
Clam Permits.....	81	
Herring Weir.....	644	
Bass Gill-Net.....	50	
Quahaug Fishery.....	52	
Salmon Fishery.....	496	
Smelt Gill-Net.....	103	
Smelt Bag-Net.....	2,337	(25 free).
Oyster Fishery.....	345	
Oyster Permits.....	130	
Bass Fishery.....	54	(5 free).
Sturgeon Fishery.....	3	
Salmon Net Permits.....	82	
Whitefish Fishery.....	18	
Lobster Pound Licenses.....	3	
Lobster Pound Certificates, 285.....		
Lease of Dark Harbour, 1.....		
	6,703	(5 cancelled and 30 free).

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## MANITOBA.

Kind of License—	No. Issued.
Special Fishery.....	2,040 (1 cancelled).
Settler's Permits.....	401
Commercial Sturgeon.....	53
Domestic Sturgeon.....	Nil.
Special Angling for Non-Residents.....	Nil.
Receipt Books.....	1,124

2,494 (1 cancelled).

## SASKATCHEWAN.

Fish Cannery.....	1
Sask. Commercial and Fisherman's.....	585 (1 cancelled).
Domestic.....	120 (1 free and 1 cancelled).
Indian and Half Breed Permits.....	632
Angling Permits.....	Nil.
Commercial Sturgeon.....	16
Domestic Sturgeon.....	10 (1 cancelled).
Receipt Books, 742 (5 cane.).....	

1,364 (1 free and 3 cancelled).

## ALBERTA.

Commercial and Fisherman's.....	699 (4 cancelled).
Domestic Sturgeon.....	Nil.
Domestic Fishery.....	146 (12 cancelled).
Commercial Sturgeon.....	Nil.
Indian and Half Breed Permits.....	272
Angling Permits.....	2,272 (5 cancelled).
Receipt Books, 846 (5 cane.).....	

3,389 (21 cancelled).

## BRITISH COLUMBIA.

B.C. Angling Permits.....	62
Fish Cannery.....	21
Indian Permits.....	164
Gill-Net, Drift-Net or Drag Seine licenses operated in conjunction with Power Boats.....	332 (5 cancelled).
Smelt or Sardine Fishery.....	77
Crab Fishery.....	186
Commercial Fishery for Salmon Trolling.....	1,858 (2 cancelled).
Salmon Cannery or Curing Establishment.....	66 (2 cancelled).
Salmon Trap-Net.....	19 (1 cancelled).
Salmon Purse Seine.....	162 (14 cancelled).
Salmon Drag Seine.....	45 (3 cancelled).
Sturgeon Fishery.....	3
Herring or Pilchard, Gill-Net or Drift-Net.....	48
Herring Drag Seine.....	2
Herring Purse Seine.....	41 (3 cancelled).
Salmon Gill-Net or Drift-Net.....	4,765
Reduction Works.....	8
Herring Drag Seine or Purse Seine for Halibut Fishing Vessels.....	Nil.
Boat License to buy fish from fisherman.....	169 (3 cancelled).
License to a person engaged in Cold Storage or fish packing to buy fresh salmon from fishermen.....	110
Whale Factory Licenses.....	3
Abalone Fishery.....	Nil.

8,141 (30 cancelled).

## YUKON TERRITORY.

Special Fishery.....	22
----------------------	----

## ONTARIO.

Cannery.....	1
--------------	---

Total number issued.....36, 128(80 cancelled and 33 free).

FIFTY-FIFTH ANNUAL REPORT

OF THE

FISHERIES BRANCH

DEPARTMENT OF MARINE AND FISHERIES

FOR THE YEAR

1921-22

PRINTED BY ORDER OF PARLIAMENT



OTTAWA

F. A. ACLAND

PRINTER TO THE KING'S MOST EXCELLENT MAJESTY

1922

[No. 29—1923]—Price, 5 cents.



Canada. Dept. of Fisheries

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SESSIONAL PAPER No. 29

A. 1923

**FIFTY-FIFTH ANNUAL REPORT**

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OTTAWA  
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PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
1922



*To General His Excellency the Right Honourable Lord Byng of Vimy, G.C.B.,  
G.C.M.G., M.V.O., Governor General and Commander in Chief of the Dominion  
of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-fifth annual report of the Fisheries Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

E. LAPOINTE,

*Minister of Marine and Fisheries.*

DEPARTMENT OF MARINE AND FISHERIES,

OTTAWA, July, 1922.



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## DEPUTY MINISTER'S REPORT

To the Honourable ERNEST LAPOINTE,  
Minister of Marine and Fisheries.

SIR,—I have the honour to submit the fifty-fifth annual report of the Fisheries Branch of the department, which is for the fiscal year ended March 31, 1922. The report deals with the following subjects:—

- Review of the Fisheries of 1921.
- Operation of the Fish Inspection Act.
- Operation of the Meat and Canned Foods Act.
- Fisheries Statistics.
- Bait Reporting Service.
- Scouting for Mackerel.
- Fishing Bounty.
- Fish Culture.
- Fishways.
- Work of the Biological Stations.
- Natural History Observations.
- International Efforts to Replenish the Fraser River.

Appendices to the report include the following:—

- Reports of Chief Inspectors of Fisheries.
- Fisheries Expenditure and Revenue.
- Summary of Licenses issued.
- Entries of United States Fishing Vessels.

### REVIEW OF THE FISHERIES OF 1921

The fishing industry was carried on during the year 1921 under the most trying conditions. The marketing of fish and fish products was found to be difficult, and prices fell to a figure which made it unprofitable for fishermen, in some districts of the Atlantic coast especially, to carry on. Production was thus much less than it otherwise would have been. It is not very surprising, therefore, to find that the marketed value of all fish and fish products for the year under review amounted to \$34,931,935. This total, which is the lowest since 1914, is over \$14,000,000 less than for 1920, and \$25,000,000 less than the peak value which was reached in the year 1918.

On the face of it this big decrease is a very serious one, but there are already abundant signs of improved marketing conditions for the product of the 1922 season, and it may be confidently assumed that the annual value of our fisheries has not only touched rock bottom, but will begin to rise steadily if more slowly than under the artificial conditions brought about by the late war. The total value for 1921 and that for 1920 was contributed to by the various provinces as follows:—

	1921	1920
Nova Scotia .....	\$ 9,778,623	\$12,742,659
New Brunswick .....	3,690,726	4,423,745
Prince Edward Island.....	924,529	1,708,723
Quebec.....	1,815,284	2,592,382
Ontario .....	3,065,042	3,336,412
Manitoba .....	1,023,187	1,249,607
Saskatchewan.....	243,018	296,472
Alberta.....	408,868	529,078
British Columbia.....	13,953,670	22,329,161
Yukon .....	28,988	33,100
	<hr/> \$34,931,935	<hr/> \$49,241,339

## ATLANTIC FISHERIES

*Cod, Hake, Haddock, and Pollock.*—Owing to low prices and poor marketing conditions the aggregate catch of the four kinds named for 1921 was 2,509,928 cwts., against 2,707,059 cwts. for the preceding year. Hake, pollock and haddock, chiefly the last named, were accountable for the decrease. The landings of the Lunenburg Bank fishing fleet were rather less than in the preceding year. This was due to the fact that fewer vessels were engaged in the fishery. The average catch per vessel was actually greater than for many years.

*Mackerel, Herring and Sardines.*—Mackerel were generally more abundant than in the preceding year. The quantity landed in Nova Scotia, New Brunswick and Prince Edward Island, in the aggregate was approximately 18,000 cwts. greater, but this increase was almost neutralized by a decrease of 15,000 cwts. in the Quebec catch, mainly at the Magdalen islands.

Low prices and a poor demand for smoked round herring adversely affected the herring fishery. The total catch amounted to 637,414 cwts., against 935,122 cwts. for the preceding year. All the provinces shared in the decrease.

The sardine catch of the Bay of Fundy was the smallest for many years. As a result of the still disorganized state of the canned sardine trade the packers had difficulty in marketing the packs of the three preceding years. Consequently, prices were low and fishermen found it unremunerative to operate their weirs.

*Other Sea Fish.*—The halibut catch was greater by 7,600 cwts., while the catch of swordfish was more than double that for the preceding year. Albacore, flounders and tomcod were taken in about the average quantities.

*Shell-fish.*—The lobster fishery suffered considerably from inactivity as a result of the low prices, which caused a number of fishermen to cease operating. While the total catch was 6,360 cwts. less than that for the preceding year, some of the provinces actually produced a greater quantity. There was a decrease of 19,000 cwts. in Prince Edward Island, and of 8,000 cwts. in Quebec. Nova Scotia on the other hand produced 17,000 cwts. more, while New Brunswick also had an increase of over 4,000 cwts. It should be noted, however, in connection with the Nova Scotia increase that had it not been for the special fishery season allowed at the end of 1921, which produced 33,000 cwts., there would have been a decrease of 16,000 cwts. as compared with the regular fishing season in the preceding year.

There was a gratifying increase in the catch of oysters. All the provinces show greater catches, New Brunswick especially so. The increase amounted to 4,000 barrels.

Clams also were taken in larger numbers in all the provinces except Nova Scotia. The total increase amounted to 2,777 barrels.

The catch of scallops was approximately 1,500 barrels greater than in the preceding year.

*River Spawning Fish.*—The salmon fishery, which had been showing diminished catches for some years, suddenly produced an increase of 14,000 cwts. over the catch of 1920. That year, however, was much below an average one.

The smelt fishery was successfully prosecuted, and resulted in an increase of 25,000 cwts. as compared with the preceding year's catch.

The fishery for alewives or gaspereaux gave very meagre results. The catch was not more than about one-third of that of the preceding year. In the Harbour of St. John, New Brunswick, where the bulk of the total catch is usually taken, the fishery was almost a failure.

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## INLAND FISHERIES

The lakes of the Prairie Provinces produced in the aggregate a somewhat greater quantity compared with the production in the preceding year. There was a decrease in value, however, of \$400,084. Notwithstanding a smaller number of men engaged in fishing, the catch in Alberta for commercial purposes showed a slight increase. An establishment for canning, smoking and salting fish was erected on the shore of lake Athabasca in the summer of 1921, and put in operation daily during the last half of September.

Fewer fishermen operated in Saskatchewan owing to the depressed condition of the markets in the first half of the year. The commercial catch, consequently, was slightly less.

There was an increased catch in the lakes of Manitoba.

The St. John River district in New Brunswick produced a slightly greater catch with a considerably greater value.

## PACIFIC FISHERIES

*Salmon.*—The salmon pack of British Columbia amounted to 602,657 cases of all kinds. This is a little more than half the number of cases packed in the preceding year. The greatly decreased pack was due in a large measure to the lack of demand for the cheaper grades, such as pinks and chums, as a result of the over-supply in recent years. Unfortunately, however, the pack of the more valuable sock-eye was a very poor one. Not only was this the case in the Fraser River district, where dwindling runs of this variety are now noted without surprise, but it was equally so in the Naas, Skeena, Rivers Inlet, and outlying districts of the north. Spring salmon were fairly abundant in some of the northern districts, and the pack of this variety was greater. It was much less, however, in the Fraser River and Vancouver Island districts.

*Halibut.*—This fishery resulted in the landing of 325,868 cwts., against 238,770 cwts. for the year 1920. Nearly two-thirds of the total landings in British Columbia were made by United States vessels, mainly at Prince Rupert, where catches were disposed of and the vessels outfitted before returning to the fishing grounds.

*Herring.*—These fish were as abundant as ever on the west and east coasts of Vancouver island. The quantity landed annually varies as a rule with the condition of the markets, and the demand. The catch for 1921 was somewhat less than that for the preceding year owing to the temporary slackness in the demand for dry, salted herring from the Orient. The demand for herring cured in the Scotch style was better in the eastern part of the United States. Efforts were made to pack a much larger quantity. A sufficient quantity of fish of the right quality was not secured, however, and the pack, although double that for the preceding year, fell far short of what was prepared for. Several companies operated purse-seines for herring at places within thirty miles of Prince Rupert during the season, and a very considerable quantity was taken. The fish were mainly disposed of for bait.

*Pilchards.*—These are very abundant on the west coast of Vancouver island. They are mostly canned. The pack of 1921 was only 16,091 cases, whereas the one for the preceding year amounted to 91,929 cases. The smaller pack was due altogether to poor market conditions. New outlets have been recently found for the canned product, however, and it is anticipated that the pack will increase in volume annually.

*Other Sea Fish.*—In addition to the foregoing, which constitute the chief kinds landed in British Columbia, such varieties as cod, flatfish, smelts, sturgeon, oysters, clams, etc., were landed in the usual quantities. These taken together contribute a considerable part to the total annual value.

*Whales.*—The market conditions were not such as to warrant the operation of the British Columbia whaling stations during 1921. Consequently there were no whales reported as having been landed.

#### INSPECTION OF FISH

Inspection of pickled fish and the barrels in which such are packed and marketed, was carried on during the season of 1921, under authority of the Fish Inspection Act as amended in 1920.

Under the original Act, packers of fish and makers of barrels were not obliged to either comply with the Act's requirements or submit their product for inspection. The amended Act, however, does make it necessary to have both fish and barrels in accordance with its provisions, and provides a penalty for infringement thereof. It also empowers inspectors to examine all pickled fish barrels and fish whenever and wherever it is convenient to do so.

The obligatory provisions in the Act entailed a much greater amount of supervisory and inspection work at the coopers' shops, the curing places and the chief receiving and shipping ports. The work was undertaken by a staff of four permanent and six temporary, or seasonal inspectors on the Atlantic coast, while one temporary inspector looked after the work in British Columbia during the fall and winter herring fishery there. The inspectors examined, approximately, 60,000 barrels of herring, mackerel, alewives and salmon. The number examined in the preceding year under voluntary inspection was 8,082 barrels.

The past season being the first in which the new Act was enforced, and as considerable stocks of empty barrels were carried over from the preceding year, it was found extremely difficult to rigidly compel compliance with all its provisions. A good deal of leniency was, therefore, exercised in using the power granted for prosecuting and penalizing offenders.

In every case, however, where a defect was discovered either in the barrel or fish, the inspector placed an official mark on the package to denote wherein they fell short of the requirements. He, at the same time, informed the barrel maker or packer personally, or by letter, of the shortcoming, and warned against its recurrence. This had the effect of bringing about good results with the least interruption of trade or irritation of traders.

Under this fostering system of inspection there has taken place all over the coast, a very remarkable improvement in the barrels now used for marketing pickled fish. The old leaky barrel of varied size and capacity, slimly held together with wooden hoops alone is being rapidly displaced by a strongly made, tight barrel of a standard size securely bound by iron hoops on the end.

As proof of the value and importance of the educative work that has been done in the barrel-making branch of the industry by our inspectors, and the excellent results already achieved, a number of letters of appreciation have been sent to the Department from time to time. Lack of space prevents the publication of all of these. One from a large firm of barrel makers in Nova Scotia, whose barrels, from the point of view of tightness and strength were previously not very greatly in favour, may be printed as a sample.

"We are getting quite a good demand for our barrels, and we are pleased to say that our customers all seem well pleased with them.

"We have to thank you for a large share of our success in giving them the kind of barrels that are satisfactory. Your advice has been worth a lot to us. We can assure you we appreciate all you have done in trying to help us to produce a better make of barrel."

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Improvement in the handling and curing of the fish is also very noticeable, although not yet to the same extent as in barrelmaking. An extract from a letter of a large dealer in, and exporter of, fish, will sufficiently indicate what has taken place in the curing and packing as a result of the work of our inspecting officers.

"The majority of the fishermen are honest, but you can hardly blame Tom Brown, when he sees his neighbour, John Smith, packing 160 pounds to a barrel and getting the same price as he (Brown) gets for 200 pounds, if he also begins packing light weight. It is not a secret in the trade that this practice had become practically universal previous to last year. We are, as you know, enthusiastic supporters of the Act, and while there may yet be room for improvement, we found conditions so much better in handling salted herring the past season that we would sooner give up this line of business than revert to the old haphazard system."

One other extract from a letter of a Nova Scotia dealer to one of our inspectors may be noted.

"We also take this opportunity to tell you that your efforts are showing splendid results. The packages are clean and well coopered, and most of the fish bright, well salted and pickled. The general appearance of products is to-day much better than ever before."

Those concerned with the shipment of dry salted herring from British Columbia to China have, from time to time, complained of the lack of uniformity in the cure of the fish, the size of the packages and the weight of fish contained in them. With a view to overcoming these conditions and setting the business on a more reliable basis, the department has been requested by the packers of and traders in this product to bring it under the provisions of the Inspection Act and establish standards for the cured fish and packages.

With the approval of the packers, a code of regulations dealing with this particular branch of trade is now being prepared, and it is expected that dry salting operations will be carried on next season under the supervision of this department's officers.

## CANNERY INSPECTION

The provisions of the Meat and Canned Foods Act, in so far as they apply to the canning of fish and shellfish, are enforced by the department's outside staff of fishery officers. Under those provisions, canneries, the raw material to be used for canning, the whole process of canning and the canned product, including the labeling and designating of such, are subject to inspection.

During the canning season of 1921 there were in operation on the Atlantic coast 536 lobster canneries, three sardine canneries and twenty canneries in which clams and scallops and fish such as mackerel, cod, haddock and herring were canned. On the Pacific coast there were in operation fifty-seven salmon canneries, two herring and pilehard canneries and one clam cannery. At Lake Athabaska in Alberta a fish cannery was completed and operated towards the end of the season. The total number of formal inspections made and reported on during the season was 2,342. There were many more inspection visits to canneries which were not formally reported.

In view of the number of complaints as to the quality and colour of canned lobster meat turned out by some of the canneries on the Atlantic coast, the administrative officers of the department arranged with the Biological Board to carry on a campaign of education amongst the canners concerning the causes of deterioration.

By direction of Dr. Knight, chairman of the Biological Board, demonstrators went from one cannery to another during the 1921 season showing by means of a miniature laboratory the growth of bacteria under unsanitary conditions and how discoloured and inferior quality of meat result therefrom.

The demonstrations were confined to Prince Edward Island. As a result thereof a pronounced improvement in the quality of the fall pack on the island was noticeable. This educational work is being extended to canners in Nova Scotia and New Brunswick during the 1922 packing season.

The Meat and Canned Foods Act provides that all canned fish imported for sale in Canada must comply with certain requirements as to labelling, weight, quality, etc. Packers or shippers of such in other countries are further required to furnish a declaration that their product has been manufactured from sound raw material and under proper sanitary conditions. The imported goods are, besides, subject to such inspection in Canada as may be deemed necessary in order to ascertain whether they conform to the requirements of the Act.

Many importations were held up in the course of the year because of improper labelling, while some were destroyed as unfit for consumption.

### FISHERIES STATISTICS

The usual work of collecting, compiling and publishing monthly, quarterly and annual statistics of the fisheries was carried on by the Statistical Branch of the department. In addition thereto a start was made in the past year to collect special statistical information concerning the quantities and kinds of fish taken on the various fishing banks for the use of the International Committee appointed to direct scientific investigations of the deep sea fisheries on the western side of the Atlantic.

A number of deep-sea vessel captains have been supplied with forms for this purpose. The information sought on the forms covers the number of days spent in actual fishing on each trip, the exact location of the ground fished on each day, the catching power used and the quantity and kind of fish taken per day.

It is hoped that with the full co-operation of the vessel captains much valuable data relative to the fluctuations in the abundance of fish on the various fishing banks will by this means be secured in the near future.

### BAIT REPORTING SERVICE

By means of the bait reporting service which has been in operation on the Atlantic coast since 1913, Masters of fishing vessels as well as others directly interested, were provided with information regarding bait supplies at various points along the coast, throughout the spring, summer and fall. Information regarding the landing of bait at various points along the coasts of the Maritime Provinces and Magdalen Islands was gathered by the officers of the department and transmitted daily by telegraph to certain ports, where the information was posted in conspicuous places. The information was also published free by the Halifax daily papers.

During the spring months telegrams reporting ice conditions and bait supplies were forwarded from Souris, P.E.I., Magdalen Islands and North Sydney, C.B., to Canso, Halifax and Lunenburg.

Throughout July and August information regarding bait supplies at points along the coasts of Halifax and Guysboro counties was transmitted by telegraph to North Sydney, Canso, Halifax, Lunenburg, Shelburne, Lockport and Yarmouth, while similar reports were also forwarded from Lockport to Halifax and Canso.

During the fall, from the first of September until the middle of November, telegrams were forwarded from Campobello, N.B., to Digby, Yarmouth, Barrington Passage and Lower East Pubnico, N.S., giving information concerning bait supplies in Charlotte and St. John counties, N.B. The above information was also transmitted by telephone from Barrington Passage to Clark's Harbour, Woods Harbour, and Port LaTour, N.S.

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## SCOUTING FOR MACKEREL

As in the preceding year the Fisheries Protection cruisers which annually follow the movements of the United States mackerel purse-seining fleet were instructed to observe the location and movement of the schools of mackerel as they approached the Nova Scotia coast and to send wireless reports daily to shore giving the results of their observations. The wireless messages were repeated by telegram to points along the coast for the purpose of keeping fishermen advised concerning the movement and volume of fish. This information is also utilized by those engaged in studying the natural history of the mackerel.

Cruising began off the western end of Nova Scotia early in May. On the 7th of that month a school of mackerel was seen off the county of Yarmouth. On May 11 and 12 two bodies of mackerel were discovered thirty to thirty-seven miles south of Cape Sable. These were moving in on the coast, one upon the east and the other on the west side of Brown's bank. Part of the school on the west side of the bank seems to have moved to the north and in conjunction with the school seen off the Lurcher shoal spread out along the western shore of Nova Scotia from Cape Sable to Port Maitland, where, diminishing in size, it remained until the middle of June, the fish having then presumably spawned and disappeared.

The main body of the schools on the east and west of Brown's bank came together and moved eastward between Roseway and the La Have banks. Part of the school proceeded towards the shore on the north of Roseway bank and on the 17th of May the fish were being taken about fifteen miles off McNutt's island, in Shelburne county; on the 21st twelve miles off the western end of Queen's county and on the 24th off La Have by United States seiners. On the 26th the main body reached Sambro bank, off Halifax harbour, where it remained for four or five days and where twenty-eight United States seiners operated successfully.

The fish then moved further to the east followed by the American seining fleet and on the 31st May were fifteen miles off Sheet harbour, on June 1 off Liscombe and on June 3 and 4 off Whitehead and Canso, about six miles.

The greater part of the main body then continued east along the coast of Cape Breton and passed Scatarie about six miles off. It proceeded north and east close to the shore until Cape North was reached when it turned into the gulf, part of it striking the Magdalen islands and part turned southward and westward towards Prince Edward Island. On June 21 the main movement seemed to come to a stop four or five miles off shore between East Point, Prince Edward Island, and Malpeque, Prince Edward Island, where such of the fish as still formed the main body, having reached the spawning stage, deposited their spawn. From the time the fish struck the western part of Nova Scotia portions of the main mass were left behind at points along the coast and as fishing continued for some time after the mass of fish had passed, they presumably spawned where they remained when the time came for that operation.

## FISHING BOUNTY

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the eastern Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1921, payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton; payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$7 each.

To owners of boats measuring not less than 13 feet keel, \$1 per boat.

To boat fishermen entitled to receive bounty, \$5.30 each.

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There were 11,674 bounty claims received and 11,654 paid. In the preceding year, 9,671 were received and 9,664 paid.

The total amount paid was \$159,449.80, allocated as follows:—

To 586 vessels and their crews, \$46,147.30.

To 11,068 boats and their crews, \$113,302.50.

## EXPENDITURE, 1921

County	Boats	Men	Amount	Vessels	Tons	Average Tons	Men	Amount	Paid	Rej.
			\$ cts.					\$ cts.		
Annapolis.....	144	230	1,410 70	1	60	60	10	193 00	145	
Antigonish.....	133	196	1,176 20						133	
C. Breton.....	301	532	3,119 80	16	217	14	56	609 00	317	3
Cumberland.....	3	6	34 80	1	11	11	3	32 00	4	
Digby.....	385	656	3,870 80	4	117	29	18	243 00	389	1
Guyaboro.....	729	1,208	7,133 80	54	828	15	249	2,573 40	783	
Halifax.....	1,203	1,695	10,195 10	61	904	15	265	2,765 00	1,264	1
Inverness.....	341	723	4,191 30	22	321	15	101	1,039 20	363	
Kings.....	43	64	382 20						43	
Lunenburg.....	680	865	5,270 90	141	8,046	57	1,994	22,038 90	821	1
Pictou.....	45	67	400 10						45	
Queens.....	191	327	1,924 10	13	238	18	65	693 00	204	
Richmond.....	425	674	4,000 60	26	449	17	120	1,289 00	451	
Shelburne.....	518	1,031	5,983 30	28	804	29	198	2,196 00	546	
Victoria.....	321	512	3,037 00	10	158	16	43	459 00	331	
Yarmouth.....	82	190	1,089 00	25	1,317	53	391	4,060 00	107	
	5,544	8,985	53,219 70	402	13,470	33	3,522	38,190 50	5,946	10
Charlotte.....	361	603	3,556 20	6	91	15	23	252 00	367	
Gloucester.....	194	446	2,566 20	152	2,252	15	655	6,859 80	346	
Kent.....	82	174	1,004 20	7	71	10	16	183 00	89	
Northumberland.....	1	3	16 90	1	21	21	4	49 00	2	
Restigouche.....	3	8	45 40	1	11	11	3	32 00	4	
St. John.....	7	13	75 90						7	
	648	1,247	7,264 80	167	2,446	15	701	7,375 80	815	
Kings.....	410	572	3,457 60	2	31	16	3	52 00	412	
Prince.....	349	703	4,113 30	7	99	14	23	260 00	356	
Queens.....	116	257	1,478 10	2	24	12	4	52 00	118	
	875	1,532	9,049 00	11	154	14	30	364 00	886	
Bonaventure.....	393	687	4,119 70	1	11	11	3	32 00	394	8
Gaspé.....	2,623	5,129	30,259 10	5	60	12	17	185 00	2,628	
Rimouski.....	138	215	1,294 70						138	1
Saguenay.....	847	1,333	8,095 50						847	1
	4,001	7,364	43,769 00	6	71	12	20	217 00	4,007	10
Totals.....	11,068	19,128	113,302 50	586	16,141	28	4,273	46,147 30	11,654	20

## FISH CULTURE

Fish cultural operations during the calendar year 1921 embraced the fresh-water and anadromous species only, and were confined almost entirely to the more important commercial food fishes, such as Atlantic salmon in the east; whitefish, salmon trout and pickerel in the interior, and the Pacific salmon in the west.

A large part of the whitefish and pickerel eggs, and practically all the salmon trout eggs were obtained from the commercial catch, and the department is, therefore, largely dependent upon the co-operation rendered by and the success of the fishermen, for such eggs. The success or failure of the work is affected in many ways, but the weather conditions during spawning period is the principal factor. If it were not for the hatcheries, these eggs would be a total loss so far as the maintenance and replenishment of the fisheries is concerned.

The commercial species in the interior were distributed in a free-swimming stage, after the food sac was absorbed, on the natural spawning areas, and largely where the eggs were collected. The sporting varieties—speckled trout in the east, and rain-

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bow and cutthroat trout in the west—were handled in limited numbers. After adequate return was made to the waters in which the eggs were collected, the most of the balance was distributed in response to applications in public water. Small allotments were also made to privately controlled or leased areas on the payment of nominal prices and transportation expenses.

## COLLECTION OF EGGS

Climatic conditions were extremely bad during the egg-collecting season in some districts, and were reflected in the number of eggs of some species that were obtained. Atlantic salmon rivers generally were in a satisfactory condition, and there were more salmon on the spawning beds than there have been for years in all the rivers where parent salmon are taken. Weather conditions on these salmon rivers were generally favourable and the full supply of eggs was readily obtained.

A change was made this season in the method of purchasing salmon for the St. John pond. Previously the salmon were bought from the commercial fishermen at their nets and transferred to the retaining pond by departmental officers. The number of salmon obtained in recent years has been small and the cost of the eggs was relatively high, as the overhead expenses under this method are the same for a few fish as they are for the full number that this pond will accommodate. This season the fishermen were paid for the salmon delivered by them in a satisfactory and acceptable condition at the pond. They, therefore, reaped any benefit there might be from careful handling, and this condition, coupled with the return of the fishing to normal, resulted in the pond receiving three times as many salmon as it did in 1920.

The salmon trap and retaining pond in the estuary of the York river, Gaspé basin, was suspended and the upper portions of the York river were inspected early in the season for the purpose of locating a suitable site for a trap-net and a retaining pond. No place was found where it was considered desirable to make the necessary outlay, and further tests were made during the summer with a trap or pound-net in the outer harbour. These tests were so encouraging that arrangements are being made with local fishermen to rearrange their nets and make them suitable for taking salmon for hatchery purposes next season. Towards the end of September two hundred and seven parent salmon for the current season were caught in seines operated by the hatchery staff in the Upper York above the best angling pools, and one hundred and fifty-six were caught in the Barachois river.

Twenty-three thousand landlocked salmon or ouananiche eggs were collected in the Metabetchouan river, Lake St. John district, Quebec. The location is rather isolated and the facilities for transferring green eggs therefrom are not favourable. It is, therefore, not advisable to continue operations in this direction until a hatchery for eyeing the eggs on the ground, and a suitable pond for retaining the parent fish through the summer, are provided. An initial effort was made by the acting superintendent of the Bedford hatchery to raise the importance and grade of that establishment by an independent collection of speckled trout eggs in that part of Nova Scotia. Water levels were away below normal and consequently the collection was not large although sufficient to justify further work along the same lines next year.

Whitefish were not as plentiful in two of the more important areas, and severe weather necessitated the liberation of quite a number of fish before they were stripped and the closing of operations at two points, consequently the total collection of whitefish eggs fell a little below the record collection of last year. All previous collections were exceeded in the Bay of Quinte and Georgian Bay districts. The grounds around Pelee island, lake Erie, were better organized and last year's collection in that particular area was doubled. There was a slight falling off in lake Erie, as a whole, in the Lake of the Woods, lake Winnipeg and lake Winnipegosis.

The weather during the salmon trout season was more favourable than usual and last year's collection was doubled. The collections were larger in all areas than they were last year. The largest increases were made in the districts covered by the Southampton and Port Arthur hatcheries. In the Great Lakes a low water temperature retarded the development of the fish in the retainers and the collection of pickerel eggs was small, but an increased collection in the Lake of the Woods district and lake Winnipeg brought the total above that of the previous year. In recent years a goodly number of pickerel have been caught in the commercial nets in the Point Edward district, lake Huron, early in the spring, but with the approach of the spawning season the catch fell off and consequently comparatively few eggs were available. An effort was made to hold these early fish in large pound-net retainers anchored alongside the commercial nets. This did not prove successful as the water was of such low temperature that the fish hardened instead of ripening.

In British Columbia climatic and water conditions as a whole were the worst in so far as the collection of eggs was concerned that have been experienced by the oldest hatchery officers. The unusual freshets washed out the hatchery pens and fences in several streams and did an enormous amount of damage to the spawning beds. In spite of these unfavourable conditions the total collection of sockeye in each of the four important hatchery areas was larger than it was in the corresponding year of the cycle. The run of sockeye to the Lower Fraser, particularly the Harrison and Cultus Lake districts was small, while an unusually heavy run—nearly five times as large as that of the preceding cycle year of 1917—occurred in the Birkenhead river. Quite a large number of sockeye, spring and coho salmon were seen on the spawning grounds of Shuswap lake and Thompson river, and more sockeye reached Stuart lake and its tributaries than in any year since 1913. The run of sockeye to the early spawning streams at the head of Owikano lake, Rivers inlet, was small, while the late streams generally were well stocked and some of them carried more salmon than they did since 1913. The best previous collection of eggs was exceeded by several millions. All the creeks and the more important spawning grounds of the Babine Lake district, with the exception of the lower Babine river, carried a good run of sockeye and were well seeded, while the run to the Lakelse lake was up to the average of the off years that occur in each cycle of four in this region. Sockeye were even more numerous in the Anderson Lake district than they were during the large run of last year, and the spawning grounds were heavily seeded. These spawning grounds were not damaged by the freshets to the same extent as were those in the lower portions of the Fraser and Skeena rivers, but there will undoubtedly be some loss of eggs and fry through receding water levels. The run to the Kennedy lake district was small and of short duration. It was somewhat similar to, although better than, the run of the preceding cycle year of 1917. This improvement was reflected in the seeding of the spawning grounds and the number of eggs collected. The run of spring and coho to the Cowichan lake district was heavy and in the opinion of some of the oldest residents was the largest they have ever seen. The unusual freshets in all the coast regions of British Columbia increased the cost and interfered to a large extent with the collection of eggs. They also did an enormous amount of damage to the spawning beds although the high water no doubt allowed a larger number of fish to escape from the commercial nets than would have been the case had normal conditions prevailed. These freshets did not extend to the Shuswap and Stuart lakes so that the spawning grounds of these regions were not damaged in that way.

The Highwood river and its tributaries were thoroughly inspected with a view to locating points where cutthroat eggs might be obtained for a small hatchery in that district. The ground was thoroughly covered, but trout were extremely scarce and nowhere found in sufficient numbers to warrant any expenditure in the way of a hatchery.

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The total collection of eggs of the different species made during 1921 was as follows:—

Atlantic salmon.. . . .	21,917,500
Ouananiche.. . . .	23,000
Cutthroat trout.. . . .	613,860
Steelhead salmon.. . . .	94,900
Kamloops trout.. . . .	460,000
Sockeye salmon.. . . .	79,930,550
Spring salmon.. . . .	2,444,300
Albino spring salmon.. . . .	9,000
Coho salmon.. . . .	1,314,750
Pink salmon.. . . .	4,911,000
Speckled trout.. . . .	560,000
Whitefish.. . . .	744,399,500
Salmon trout.. . . .	40,186,500
Pickarel.. . . .	215,723,000
	<hr/>
	1,122,592,860

In addition to the eggs collected, six hundred thousand rainbow trout eggs and nine hundred and eighty thousand speckled trout eggs were purchased from commercial firms; five hundred and seven thousand rainbow trout eggs, two hundred thousand cutthroat trout eggs, eight hundred thousand speckled trout eggs and eighty-five thousand brown trout eggs were received from Federal and State Departments of the United States in exchange for Atlantic salmon eggs.

Under an arrangement made with the Department of Game and Fisheries, concurred in by this department, the officers of the Federal hatchery at Cape Vincent, N.Y., collected whitefish and lake herring eggs in Canadian waters on the Ontario side of the boundary line. This department is indebted to the United States Bureau of Fisheries for a present of 28,215,000 whitefish from the surplus collection at the Cape Vincent hatchery. These eggs were placed in the Kingsville hatchery. It is also indebted to the Department of Game and Fisheries, Toronto, for 18,750,000 pickerel eggs that it collected in Hay bay, Bay of Quinte. These eggs were placed in the Thurlow hatchery and a portion of the resulting fry were placed at the disposal of the provincial department for stocking waters that are not as readily accessible from its own hatcheries. A surplus collection of 1,568,000 salmon trout eggs, included in the above statement, from this department's hatchery at Wiarton was turned over to the provincial hatchery at Sault Ste. Marie, Ont.

## REARING OF FINGERLINGS

Greater attention was given to the rearing and feeding of fry, and the distribution of advanced fry and fingerlings was increased by one hundred and forty-two per cent., or from nine and a half to twenty-three millions. The existing ponds and tanks were extended at several hatcheries, and natural ponds in the shape of creek beds in which the water is readily controlled were utilized in all instances where suitable conditions of this nature were found within reasonable distance of the hatcheries.

The question of food is one of the greatest problems in the feeding of fry, particularly at the isolated hatcheries. Many kinds of food have been tried, prepared in different ways and fed in different rotations. Raw beef liver would appear to produce the best growth, but it is somewhat expensive and cannot be shipped in a frozen state to the remote hatcheries. Fishotein, a prepared food, is a good standby as it will keep almost indefinitely, but the fry soon tire of it and appear to sicken if fed on it for any length of time. The "ball" method of feeding canned salmon, which apparently originated with Superintendent Gibbs, of the Babine hatchery, has been followed with satisfactory results at several hatcheries in British Columbia. The salmon is properly ground and then made into small balls with a stone in the centre to keep them from floating. The balls are placed in an egg-basket, the

sides of which have been cut down and lowered to within three or four inches of the bottom of the pond. There is very little waste and any residue is readily removed without fouling the ponds. The paddle wheel automatic feeder was very effective with canned and fresh fish, particularly at outlying ponds, as by filling them night and morning a steady supply of food is provided.

The success previously referred to that is to be met with from distributing fry in lakes that are barren of fish life and in which natural fish food is abundant was amply demonstrated during the past year. The necessary protection from other fish is provided and the cost of feeding is eliminated. The greater part of the sockeye fry distributed in Grace lake at the headwaters of Morris creek, near the Harrison lake hatchery, in April, 1920, left the lake during the following July and August when they had attained a length of three inches. Similarly sockeye fry placed in Hicks lake in June, 1920, migrated therefrom in May of the following year. The first to migrate were eight inches long and they gradually decreased to five inches as the migration progressed.

There are undoubtedly numerous lakes in the mountainous regions which meet the requirements up to a certain point, but they are not always conveniently accessible to the several hatcheries or the outlets are not always such as can be negotiated safely by the young fish when passing out on their way to salt water. In some cases an impassable fall will prevent the safe descent of fry and unless some reasonably inexpensive means can be devised for the safe passage, such lakes can be of no use for the purpose required. At certain points it is convenient to transfer young fry from the hatcheries, but at others it is necessary, on account of the distances and other difficulties of transportation, to use eyed eggs by either planting them in the gravel in the inlets or in temporary hatching troughs. This inexpensive and efficient system is being developed at all points accessible from the hatchery where the desired conditions are found to the fullest possible extent.

#### EQUIPMENT

A highly efficient box by means of which eyed eggs can be planted in suitable localities under water, in such manner as to insure all of them being at a suitable depth below the level of the stream bottom, was perfected by the District Inspector of Hatcheries for British Columbia. With this box the eggs can be planted in quite rapid water, which is so often found on the spawning beds of the salmon. This box facilitates the stocking of suitable areas to which it is not feasible to convey fry from the hatcheries; it facilitates the stocking of sparsely seeded areas with eggs from heavily or over-seeded streams, and it permits such plantings being made with eyed eggs that are 100 per cent fertilized after the freshet season, which guards against the destruction of the ova by the scouring out of the stream beds, receding waters; ducks, gulls and other natural enemies. Certain tributaries of the Upper Fraser and other isolated waters have been stocked in this way.

A graduated whitefish hatching jar has also been perfected, and it will take the place of the present jars as replacements are necessary. The graduations are of the greatest convenience in calculating the egg contents of the hatcheries at any time. This improvement was first suggested by the District Inspector of Hatcheries for the eastern division. The superintendent of the Pemberton hatchery experimented rather fully in handling green sockeye eggs in different ways, and is of the opinion that the loss is smallest when the eggs are transferred and laid down in the troughs while they are still in a soft state and before they are water-hardened. His conclusions are in line with those arrived at by the superintendent of Harrison lake, in the tests made by him some years ago at Cultus lake. This method is apparently limited in its application as it has been found successful only with eggs that can be placed in the hatchery troughs shortly after they are taken.

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An experiment was carried out with a view to finding out the result of the vibration of a seaplane on eyed eggs when they are being transported from one point to another. Two thousand each of both the sockeye and pink varieties were taken from the Harrison Lake hatchery and carried for forty-five minutes in the air at an altitude of five thousand feet. They were later carefully placed by themselves in the hatchery troughs and their condition closely observed. The several subsequent reports from the superintendent of the hatchery show that absolutely no injury resulted.

This experiment is interesting in view of the possible use of seaplanes for the purpose of stocking otherwise inaccessible portions of the Fraser River watershed or other localities. The one objection to this method, however, is the probable high cost in connection with the operation of the air service which may possibly make it prohibitive in so far as fish cultural operations are concerned.

## ACCLIMATIZATION

In response to a largely signed petition from the anglers and residents of the St. John district, supported by the civic bodies and others, the department agreed to make a systematic attempt to establish the European or Brown trout in Loch Lomond, near St. John. The petitioners were fully advised with regard to the possibility of the Brown exterminating the native speckled trout, but they were strongly in favour of obtaining the larger fish, particularly as it is a surface feeder and furnishes better sport during the summer months. Loch Lomond is well adapted for such an experiment as it is a comparatively small and self-contained system and not connected with any large watershed. Brown trout eggs are not easily obtained, and the initial shipment of eighty-five thousand were procured through the courtesy of the United States Bureau of Fisheries in exchange for Atlantic salmon eggs.

## MARKING OF FISH

The marking of fingerling and adult fish was continued on a larger scale than in any previous year, the object being to obtain some definite information as regards the frequency in spawning; the constancy in regard to the dates at which the same salmon ascends the rivers from the sea; the percentage of well mended kelt that return; the percentage of artificially fed fry that return as salmon; if rapid growth has any effect on the return of salmon fry, and the extent to which sockeye enter the Fraser river after the regular fishing season. Adult salmon were marked by a numbered silver tag attached to their dorsal fin, and the fingerlings in most instances by the removal of the adipose fin.

The recapture of 152 Atlantic salmon that were marked and liberated after they were stripped at the different retaining ponds has been reported to the department. Forty-eight were recaptured before they had left the river and 104 after their return from the sea, as clean fish. The salmon for most of the retaining ponds are purchased from the commercial fishermen. These fish are all caught in the first instance and also recaptured by anglers and commercial fishermen during the spring and early summer. In the Miramichi and Margaree rivers the salmon for hatchery purposes are caught in nets operated for that purpose only. These nets begin fishing on or about September 15 and August 25 respectively. The recapture of sixty-two clean salmon that were marked and liberated in these two rivers have been reported. They were all in the first instance caught after August 25. Forty-seven, or over seventy-five per cent, were recaptured in the spring and early summer, all before August 16, and only fifteen, or less than twenty-five per cent, after that date. These returns, although limited, are definite in character and indicate that heredity is not the predominating influence as regards the time that salmon ascend the rivers from the sea, and that a salmon that ascends late in the season any year is liable to be an early fish on its return from the sea.

## RELATIONS WITH OTHER GOVERNMENTS

Closer co-operation now prevails than ever before between the department and the provincial officials in fish cultural matters. The most cordial relations exist between the department, the United States Bureau of Fisheries and the provinces in contiguous waters where the different services co-operate for the mutual benefit of all concerned. The assistance and co-operation of the lessees of angling rights is also acknowledged; particularly the Restigouche Riparian Association, which for several years has placed its launch, free of any charge, at the disposal of the department for towing parent salmon for the New Mills salmon pond, N.B., and the lessees of the York and Barachois rivers, Gaspé, Que., in whose waters the salmon eggs for the Gaspé hatchery were collected.

No new establishments were built during the year but numerous expansions, repairs and replacements were made at the different hatcheries, and they are all fully equipped and in a reasonably good state of repair.

On the night of October 28-29, owing to unusually violent freshets, both of the water mains which supply the city of New Westminster were broken and considerable portions carried completely away. As the new Westminster hatchery is dependent upon the city supply, operations had to be discontinued until the water system is permanently repaired, which it is anticipated will not be until about May, 1922.

In recent seasons, the collection of eggs for the Gerrard hatchery has been disappointing owing undoubtedly to the series of dense log and brush jams which have formed in the Lardeau river. These obstructions are huge, and the expense which would be involved in their removal would amount to many thousands of dollars. It was felt that the results which could reasonably be expected from the maintenance of a fully equipped hatchery would not be commensurate with the heavy expense involved in removing the afore-mentioned obstructions, and it was, therefore, decided to use the hatchery buildings as an eyeing station only, and, after planting a fair proportion of the collection in the streams from which the eggs were taken, to distribute the balance in other desirable lakes and streams.

A summer school for hatchery officers in the Maritime Provinces and Quebec was held at Truro, N.S., from August 2 to 19, 1921. The course of study was arranged by the Biological Board, and the school was conducted under the personal direction of the board's chairman, Dr. A. P. Knight, until recently of Queens University. The subjects taken up were the physical and chemical properties of air and water, and the structure and functions of some typical animals and plants in relation to hatchery problems.

The staff, without exception, was most conscientious, faithful and unsparing of personal effort in the discharge of their duties. The well merited appointment of Mr. C. W. Harrison, as District Inspector of Hatcheries for British Columbia, will enable the question of needed expansion in the province to be taken up in a more vigorous manner than has hitherto been possible.

Most regrettable and unfortunate losses occurred in the death by drowning during the freshets of Mr. T. H. H. Guegan at the Lakelse Lake hatchery, and Mr. H. Ross at the Pemberton hatchery, B.C.

Thirty-four main hatcheries, twelve subsidiary hatcheries, six salmon retaining ponds and a large number of egg-collecting camps were operated. The total distribution of all species was ninety-five and a half millions larger than it was last year and several lakes in the Western Provinces that are not readily accessible from a hatchery were stocked by the transfer to them of fish from other waters.

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The total distribution of eggs and fish by species and by provinces during 1921 was, as follows:—

Nova Scotia—			
Atlantic salmon.. . . . .	6,427,500		
Rainbow trout.. . . . .	89,500		
Speckled trout.. . . . .	416,400		
			6,933,400
New Brunswick—			
Atlantic salmon.. . . . .	9,232,715		
Spring salmon.. . . . .	286,825		
Speckled trout.. . . . .	189,444		
Brown trout.. . . . .	23,057		
			9,732,041
Prince Edward Island—			
Atlantic salmon.. . . . .	871,946		
Speckled trout.. . . . .	292,422		
			1,164,368
Quebec—			
Atlantic salmon.. . . . .	4,177,809		
Ouananiche.. . . . .	12,705		
Speckled trout.. . . . .	26,679		
			4,217,193
Ontario—			
Spring salmon.. . . . .	125,350		
Whitefish.. . . . .	268,103,500		
Salmon trout.. . . . .	17,945,702		
Herring.. . . . .	5,620,000		
Pickarel.. . . . .	124,097,000		
			415,891,552
Manitoba—			
Whitefish.. . . . .	233,842,300		
Pickarel.. . . . .	41,528,000		
			275,370,300
Saskatchewan—			
Whitefish.. . . . .	20,575,000		
			20,575,000
Alberta—			
Atlantic salmon.. . . . .	133,600		
Ouananiche.. . . . .	1,218		
Rainbow trout.. . . . .	649,752		
Cutthroat trout.. . . . .	379,550		
Salmon trout.. . . . .	136,756		
			1,300,876
British Columbia—			
Atlantic salmon.. . . . .	277,641		
Cutthroat trout.. . . . .	61,216		
Steelhead salmon.. . . . .	81,877		
Kamloops trout.. . . . .	417,769		
Sockeye salmon.. . . . .	84,789,624		
Albino spring salmon.. . . . .	76		
Spring salmon.. . . . .	3,513,387		
Coho salmon.. . . . .	3,476,811		
Pink salmon.. . . . .	250,000		
Chum salmon.. . . . .	5,380,000		
Speckled trout.. . . . .	48,520		
Whitefish.. . . . .	12,375,000		
			110,671,921
Total distribution.. . . . .			845,856,651

## FISHWAYS

In accordance with the policy adopted last year, monthly reports of the conditions of all fishways within their districts have been received this year from the fishery overseers. This has enabled the department to keep in closer touch with this class of work and to take steps where such are required to have defects remedied from time to time.

In addition to the reports above stated, the departmental engineer made an inspection of a number of dams requiring new fishways or repairs to the existing ones, and secured data for the preparation of plans from which they could be constructed.

In several instances where the owners of dams had complied with the regulations regarding fishways, the department undertook the construction of new ones.

The following is a list of dams inspected by the engineer in the Maritime Provinces last year:—

*Tusket River*—Yarmouth County, N.S.—

- (a) Yarmouth Light and Power Company, Limited, power dam.
- (b) Yarmouth Light and Power Company, Limited, storage dam.

*Herring Brook*—Yarmouth County, N.S.—

- (a) Babine and Porthier's dam.

*Clyde River*—Shelburne County, N.S.—

- (a) Clyde Pulp Co. storage dam at Queens.
- (b) Clyde Pulp Co. pulp-mill dam.
- (c) Sutherland Lumber Co. saw-mill dam.

*Black Brook*—Shelburne County, N.S.—

- Canadian National Railway dam.

*Mersey River*—Queens County, N.S.

- (a) Minard's dam at Milton.
- (b) Harlow and Kempton's dam
- (c) Pulp-mill lower dam.
- (d) Pulp-mill upper dam.

*Medway River*—Queen's County, N.S.—

- (a) Pulp-mill dam at Charleston.
- (b) Salter's Falls.

*Petite Riviere*—Lunenburg County, N.S.—

- (a) G. B. Crouse dam.
- (b) Alfred Kaulback dam.
- (c) Henry Kaulback dam, Conquerall Mills.

*Lahave River*—Lunenburg County, N.S.—

- (a) Davison Lumber Co. lower dam.
- (b) Davison Lumber Co. upper dam.
- (c) W. E. Parnell, pulp-mill dam.
- (d) Ed. Zwicker and Sons, mill dam.

*Mush-a-mush River*—Lunenburg County, N.S.—

- (a) Nova Scotia Power Commission power dam.
- (b) Edwards Ernst dam.
- (c) Robar's dam.
- (d) Nova Scotia Power Commission storage dam at foot of Little Mush-a-mush Lake.
- (e) Nova Scotia Power Commission storage dam at foot of Big Mush-a-mush Lake.

*Sackville River*—Halifax County, N.S.—

- (a) Sackville Electric Light Co. dam at Bedford.

*Nine Mile River*—Halifax County, N.S.—

- (a) Blanchard and McCurdy dam.

*Musquodoboit River*—Halifax County, N.S.—

- (a) Abandoned dam at Musquodoboit Harbour.

*Sheet Harbour River*—Halifax County, N.S.—

- (a) Sheet Harbour Lumber Co. dam (west branch).

*Rights River*—Antigonish County, N.S.—

- (a) Vintens dam at Sylvan Valley.

*Lequille River*—Annapolis County, N.S.—

- (a) Town of Annapolis. Power dam.
- (b) Town of Annapolis. Storage dam.

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*Annapolis River*.—Annapolis County, N.S.—

(a) Town of Lawrencetown power dam.

*Gaspereaux River*.—King's County, N.S.—

(a) Wright and Joudry power dam.

*Kouchibouguac River*.—Kent County, N.B.—

(a) Camerons Mill dam.

*Kouchibouguac River*.—Kent County, N.B.—

(a) Town of Richibucto power dam.

*Nashwaak River*.—York County, N.B.—

(a) Nashwaak Pulp & Paper Co., dam.

*Pokiok River*.—York County, N.B.—

(a) Dam at the foot of lake George.

In some instances inspections of dams were for the purpose of obtaining data for the preparation of designs for fishways, while in others it was desirable to ascertain if fishways previously constructed were effective.

The department undertook the construction of the following works during the year the owners in the case of fishways having complied with the regulations:—

*Tusket River*.—Fishway in the Yarmouth Light and Power Company Hydro-Electric power dam.

*Mersey River*.—Fishway in Minard's dam at Milton. Repairs to fishway in Harlow and Kempton dam. Alterations to fishway in pulp mill lower dam. Completion of fishway in pulp mill upper dam.

*Medway River*.—Cleaning out channel and construction of wing dams through Salters falls to assist in the ascent of salmon during low water.

*Lequille River*.—Construction of additional partitions in the Annapolis Hydro-Electric power dam fishway.

*Nashwaak River*.—Slight alterations to the foot of the fishway in the Nashwaak Pulp and Paper Company dam.

The following fishways were constructed during the year by the owners of dams from plans furnished by the department:—

*Clyde River*.—Fishway in Clyde Pulp Company dam at Queens.

*Mush-a-mush River*.—Fishway in storage dam at foot of Little Mush-a-mush lake.

Fishway in storage dam at foot of Big Mush-a-mush lake.

*Gaspereaux River*.—Alterations to fishway at Wright and Joudry dam to meet conditions created by extension to power plant.

*Apple River*.—Construction of fishway in C. H. White & Son dam.

*Lequille River*.—Construction of fishway in dam owned by H. Harnish.

*Lahave River*.—Construction of fishway in second dam at Bridgewater.

*Pokiok River*.—Construction of fishway in dam at foot of lake George.

*Kouchibouguac River*.—Alterations to fishway in dam owned by the town of Richibucto.

A large number of dams throughout the Maritime provinces form problems in the construction of fishways which are difficult to overcome, owing to the fact that many of them are on small streams, where, during the greater part of the season, the volume of flow is quite small. Operation of the power plant in such dams usually drains the water down to such an extent that the fishway becomes dry. On the whole, however, progress is being made. In the case of the Mersey river, which has been obstructed for a number of years, reliable reports indicate that the construction of fishways resulted in numbers of salmon ascending.

Conditions on the Medway river are also reported to be much improved this year, as a result of the work done, and an agreement with the Pulp Company regarding the periodical operation of the mill during low water.

The fishway in the dam on the Gaspereaux river has proved quite satisfactory, both salmon and alewives having been seen to ascend it in numbers.

In British Columbia the work in this connection is confined principally to the removal of obstructions to the ascent of salmon. The principal works undertaken were as follows:—

*Granite and Scullabuchan Creeks.*—Both of these streams flow into Lakelse lake, which in the past has been a favourable spawning area for salmon of the sockeye species. The removal of accumulated debris resulted in the flow of water passing along the old channels and has restored considerable spawning area.

*Atnarko River.*—The work done during the year comprised a completion of removal of obstructions on the Bella Coola and Atnarko rivers. Natural conditions are now restored and large spawning areas opened up again to ascending salmon.

*Mink Trap Bay.*—The operations at this point necessitated the use of heavy machinery as the accumulated debris completely blocked the entrance of the stream. The obstruction was satisfactorily removed and reports show that as a result, spawning sockeye salmon reached the lake above.

*Markwell River.*—The Markwell river, although not a salmon stream, has been diverted from its main channel and was wearing away the bank which separated it from the very valuable spawning area of Genesi creek, and had it been successful would have completely ruined the sockeye grounds. By the removal of a log jam and the excavation of a channel some 300 feet long, the stream was permitted to flow down the old channel and the necessary protection to Genesi creek assured.

*Fishermans River.*—This river was cleaned of log jams for a distance of  $3\frac{1}{2}$  miles from its mouth and it is anticipated that ascending fish will have no difficulty in reaching the spawning grounds.

*Salmon River.*—At Salmon river the work consisted of the removal of a large portion of a log jam about one mile from Shuswap lake and cutting of a channel 30 feet wide through the remainder of the jam. The Shuswap lake area at one time teemed with sockeye salmon and at the present time efforts are being made by the way of fish culture to restore this run, and by clearing out obstructions in the streams to permit the return of parent fish for natural spawning.

*Skutz Falls, Cowichan River.*—In the case of the Cowichan river at Skutz falls, it was necessary to widen the channel and construct a series of concrete steps to assist the passage of salmon. The work accomplished this year has resulted in the fish being able to ascend without difficulty.

In addition to the above numerous other points received attention to a more limited extent.

In the three Prairie Provinces the work in connection with fishways consisted principally of inspections by the officers to see that the structures were kept in good condition and open to the ascent of fish.

Considerable difficulty was experienced at the Canadian Pacific Railway irrigation canal at East Calgary, where the closing of the head gates resulted in immense numbers of fish being stranded.

The establishment of screens to prevent the entry of fish into the canal was looked into and found to be practically impossible.

By an arrangement with the company in which it agreed that the head gates should be closed very gradually, the greater number of fish in the canal ascended to the main river before the water became too low and by allowing a very small run to continue throughout the winter those which remained were found to have passed the winter without loss.

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## BIOLOGICAL STATIONS OF CANADA.

The work of the two Biological Stations was much extended during the year 1921-22, and embraced more than a dozen distinct schemes of investigation. These may be summarized as follows:—

1. Laboratory researches carried on by a staff of twenty-five university professors, assistants and advanced researchers. For a year's investigations the specially equipped tables, scientific instruments and other facilities of the two stations were fully utilized.

2. Investigations carried on in various ways, more or less distant from the stations, included the continued oyster culture experiments and studies on the Prince Edward Island oyster beds, Shad Investigations in Cobequid bay, and the adjacent rivers and streams and other lines of work, also Smelt and Flounder spawning Investigations in various localities, etc.

3. Inshore and offshore (deep-sea) researches carried on by the staff on board the Biological vessel *Prince* on the Atlantic coast and by the Biological vessel *Ordenez* on the Pacific coast.

4. A scheme of studies at curing stations and canneries with special reference to dried and canned fish and the "blackening" of lobsters and the "reddening" of salted cod.

5. Further lobster studies, especially the experimental study of larval lobsters at St. Andrews and at Summerside, P.E.I.

6. Tidal pool studies and inshore work on the conditions of fish life in Passamaquoddy bay and on the Vancouver island shore.

7. Further water researches in the Great Lakes, particularly the study of the lake herring in the waters of lake Erie.

8. Courses of instruction on the best conditions for lobster canning and addresses on the causes of spoilt canned lobsters. This work was carried on under Dr. Knight's superintendence, mainly on Prince Edward Island, and included addresses by Dr. Knight and Dr. Prince to the inspectors and fishermen at their conference in Charlottetown.

9. Collections of fishery and other marine material during the winter and summer months, weekly and monthly and special plankton and hydrographic work all the year around by the cruises of the *Prince*.

10. Similar field investigations were carried on from the British Columbia Station, and water samples, temperature observations and other work was done in the waters north and south of the station including dredging trips up to Lasqueti island and as far south as Thetis island, and work at the mouth of the Fraser river.

11. Bottom and surface studies of the biology and conditions of Kennebecasis waters, St. John river, N.B.

12. The preparation and publication of a series of reports of fisheries, etc., under the editorship of Professor J. P. McMurrich, these being a continuation of the "Contributions to Canadian Biology" (new series).

13. The station also, through its staff, gave assistance in the scheme of international fisheries investigations and will during the coming seasons take an important part in this work.

## INTERNATIONAL WORK

In addition to the lines of opportunity pertaining to the operations of the stations proper, the board has in various ways aided in the completion of an international scheme of investigations, and prepared a plan of work in which the services of the board's vessel *Prince* would be utilized. The study of the mackerel migrations on the Atlantic coast are specially included in this work. Dr. Huntsman and Professor McMurrich have been named as members of the Joint International Committee and their services have been enlisted in co-operation with eminent United States scientists appointed by the federal authorities, Washington, D.C.

## BUILDING EXTENSIONS

Both stations have been much inconvenienced by shortage of laboratory accommodation and boarding facilities for workers owing to the increasing number of qualified workers who have made application for permission to conduct fishery and marine investigations under the board. The necessity of extending the Pacific Station has been forced upon the board for several years, and plans had been completed for the erection of new additions to the station near Nanaimo, B.C., but in view of the limited appropriation it was not possible to proceed with the work. The larger vote generously granted by Parliament will now make feasible these extensions of the premises at Departure Bay, which include a new chemical room, balance room and museum accommodation, the latter being in the lower portion of the proposed extension, while an electric lighting system replaces the existing dangerous mode of illumination hitherto adopted. At St. Andrews the laboratory accommodation has been largely increased by the addition of a large terminal wing added on the west end of the old building and by a new library apartment and a well equipped bacteriological and biochemical laboratory. The much needed extension of the residence was also planned by the board, but could not be carried out owing to lack of funds. Rearrangement of the rooming and dining accommodation carried out by Dr. Huntsman has, however, provided for a largely increased staff of scientists. The increasing number of trained workers resorting each season to the stations may render it necessary to carry out completely the extensions planned. A very important addition to the equipment at St. Andrews is the new up-to-date refrigeration operations for experiments with frozen fish and other important products. Additions to the scientific appliances have been made from time to time and the two Biological vessels *Prince* and *Ordonez* have been repaired and have been employed in carrying out towing and other biological and physical work already referred to.

## PROBLEMS INVESTIGATED

The two stations which at one time confined their work mainly to the summer months have now been able to arrange for continuous work all the year around, though the main researches of the staff are carried on from early in June to the end of September.

Among the workers and their problems during the past year have been:—

Dr. A. P. Knight, Chairman of the Board: "Lobster Rearing and Bacteriology of the Canning Industry."

Dr. E. E. Prince: "Studies of Temperature and Light in rearing Larval Lobsters, as well as other fishery studies."

Professor L. W. Bailey: "Canadian Diatoms of the Atlantic and of Northern Waters."

Professor E. M. Harvey, Princeville, N.S.: "Bioluminescence in Marine Animals."

Principal Harrison McDonald: "Bacteriology of Canned and Dried Fish, also 'red' cured cod."

Miss M. E. Kennedy, Macdonald: "Studies on reddened salt cod."

Professor C. J. Connelly, St. Francis Xavier: "Young stages of crab, shrimp, etc."

Dr. A. G. Huntsman: "Factors influencing Reproduction and Growth of Marine Forms."

Dr. S. J. Jackson, McGill: "Histology of Frozen Fish Tissues."

Professor A. B. Klugh, Queens: "Culture of Copepod, Ostracod and other Aquatic forms."

Mr. A. H. Liem, Toronto: "H-Ion concentration in relation to copepod life, also shad fishery researches."

Miss Pallon, Manitoba: "Chemistry of Fish Muscle Stroma."

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Miss D. E. Newton, Macdonald: "Spore forming Bacteria."

Miss M. E. Reid, Toronto: "Spawning of Sea Perch."

Miss E. M. Taylor, Toronto: "H-Ion concentration as affecting Marine Animals."

Miss A. E. Dempsey, Toronto: "Chemistry of Fish Muscle Juice."

Miss F. Fraser, Toronto: "Effect of Light on Growth of Inter-tidal animals."

Among those conducting researches in localities more or less distant from the station:—

Professor P. Cox, Fredericton: "Biology of S. W. Nova Scotian Waters."

Miss M. S. Sparks, Toronto: "Fish Studies off Nova Scotia Coast."

Professor A. D. Robertson; Western, London; Miss Battle and Miss McIntosh: "Further Oyster Investigations, Prince Edward Island."

Mr. A. H. Leim: "Shad Studies at the head of the Bay of Fundy."

The Pacific Station has a similar full record of work carried on including:—

Professor McLean Fraser, Vancouver: "Food of British Columbia Fish, study of Hydroids, etc."

Professor C. H. O'Donoghue, Manitoba: "Taxonomy and other Studies."

Professor A. T. Cameron, Winnipeg: "Causes of variation in sea water, composition, iodine in Annelid, etc., also joining with Professor O'Donoghue, "Light Reactions on free swimming Animals influenced by drugs."

Miss Mounce, Winnipeg: "Variation in distribution of diatoms due to water conditions, also distribution of algae in selected areas, etc."

Mr. H. A. Dunlop, Vancouver: "Distribution of free-swimming copepods."

Mr. R. E. Foerster, Vancouver: "Systematic Study of Medusae."

It may be added that the laboratories at each station have received important additions during the year and that the addition of a collector of material (Captain Rigby) has been of great assistance, and under the direction of Dr. Huntsman at St. Andrews, who has been responsible in carrying out the elaborate problem undertaken for the past season at St. Andrews, and under the superintendence of Dr. McLean Fraser, who directed the varied activities at the Pacific Station, most successful fishery and other researches have been completed. Professor Fraser agreed to the board's proposal to continue as Director of the British Columbia Station after his appointment as Professor of Zoology in the University of British Columbia, and he has arranged as regularly as possible to visit the station and to spend all the available time possible in carrying on the work there. The two stations under their able directors are accomplishing a greater amount of valuable work than has been possible during the previous years of the operations of these valuable Government institutions.

## NATURAL HISTORY OBSERVATIONS

During the summer and fall of 1921, Mr. Andrew Halkett, the department's naturalist, carried on observations as to the condition of the lobsters in the counties of Queens and Shelburne, N.S., on the Northumberland strait shore, and at the Magdalen islands. Much useful data concerning the condition, size, and sex of the lobsters taken, and the depth and temperature of the water from which they were taken, has been obtained, tabulated and filed. Observations of the condition of the scallop and scallop beds of Mahone bay, N.S., were continued during the month of June.

Meetings were also held by the naturalist during January, February and March of the present year at places along the shore of Westmoreland, Kent, Northumberland and Gloucester counties, N.B. The meetings took the form of talks to fishermen, followed by discussions on the importance of preserving seed lobsters, the spawning and moulting habits of the lobster, and kindred subjects. In addition thereto, the subject of bacteria and their effect on canned lobster meat was touched on, and a number of lantern slides, showing the various kinds of germs, were utilized in illustrating their growth.

## INTERNATIONAL EFFORTS TO REPLENISH THE FRASER RIVER

Owing to the sockeye fishery of the Fraser river and its approaches having become so seriously depleted as to reduce the annual pack to a very small fraction of that of past years, efforts have in recent years been made to find a means of restoring the former condition of this fishery. Owing to the fact that the salmon making for the Fraser river pass through the waters of Puget sound, on the United States side of the line, it is useless to put into force any regulations curtailing fishing operations on the Canadian side, unless similar steps are taken on the American side of the line. Many meetings have been held by the authorities, or by representatives of the two Governments concerned, with a view to arranging for some co-operative action, in order to preserve the valuable sockeye run to the Fraser. Up to the moment, it has not been possible to secure such co-operation. It was hoped that the draft treaty recommended by the Canadian American Commission, of 1918, would have provided a means of dealing satisfactorily with the situation. Unfortunately, the United States Senate threw out the treaty as a result of opposition to it from the State of Washington.

When it became apparent that no help could be expected from the proposed treaty, steps were taken to arrange a meeting between representatives of this department and the newly appointed State of Washington Fisheries Board, with a view to reaching some understanding on the question of restoring the sockeye run to the Fraser river.

A meeting was held in Vancouver on December 12 last, the following being present to represent Canadian interests: W. A. Found, Major J. A. Motherwell, Dr. C. McLean Fraser, F. Harrison, John P. Babcock.

The representatives of the State of Washington present were: E. A. Sims, H. Ramwell, E. P. Blake, E. A. Seaborg, L. H. Darwin.

The following subjects were placed before the meeting for consideration:—

1. Perpetuation of the sockeye salmon common to the Fraser river system, the other waters of the Gulf of Georgia and its tributaries and of the Strait of Juan de Fuca and Puget sound.

2. Protection of the salmon of the coastal waters of Vancouver island and the State of Washington.

3. To increase the pink salmon in the waters mentioned in section 1 and also of Puget sound wherein pinks contribute to the supply in such contiguous waters.

4. That the pink run be built up in the even numbered years.

5. That where salmon runs have been depleted, salmon eggs or fry be imported from such places as they can be procured for re-stocking.

6. Regulation of seasons in British Columbia and Puget sound.

7. The maintenance and operation of such international hatcheries as are necessary for reproduction of salmon.

No agreement was reached on measures to be taken for the restoration of the sockeye salmon run to Puget sound and the Fraser river. Both sides agreed that if the sockeye run is to be restored there must be a complete stoppage of fishing for at least five years. The Canadian authorities agreed to this only on condition that at the end of the five-year period, when fishing is resumed, the use of purse-seines for the capture of sockeye must be prohibited and the use of fish traps and gill-nets properly regulated.

Canadian representatives expressed the opinion that the sacrifice involved in the total cessation of fishing for five years would not be worth enduring if at the end of that time the use of these appliances were permitted as at present.

The Washington State representatives took the ground that it would be unwise for them to make an agreement which would tie the hands of those who might be in authority and dealing with state fishing matters five years hence; that as the situation

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is one calling for immediate action, no consideration as to what might take place six or seven years afterwards should be allowed to interfere with the taking of the necessary measures to restore the sockeye run.

Tentative agreements were reached on several of the other questions which came before the meeting. These include:

1. Protection of immature salmon in the coastal waters of the west coast of Vancouver island and the Washington shore.
2. Investigations to ascertain the desirability of prohibiting fishing inside the three-mile limit off Vancouver island and the coast of Washington.
3. Proposal to establish humpback runs during the even numbered years in Puget sound and Fraser river waters similar to those in the odd numbered years and the bringing of eggs from other points in British Columbia and Alaska to effect this.
4. A general biological survey of the waters of the Fraser river and the adjacent Washington areas to ascertain the possible extent to which salmon may be propagated in that system.
5. To hold another conference later on for the purpose of regulating humpback fishing to permit of a sufficient escapement of this variety of fish to the hatchery streams and natural spawning grounds.

In closing this report I much regret to say that the prosecution of our fisheries during the year under review was accompanied by the usual loss of life. In each month of the main fishing season from one to eight fishermen were drowned on the Atlantic side. Altogether twenty-five lives were lost, twenty on the Atlantic and five on the Pacific.

I am, sir, your obedient servant,

A. JOHNSTON,

*Deputy Minister of Marine and Fisheries.*

## APPENDIX J.

## REPORTS OF INSPECTORS OF FISHERIES

REPORT OF CHIEF INSPECTOR, WARD FISHER, ATLANTIC FISHERIES  
DIVISION, 1921

The past year was, without doubt, the most unusual and trying season experienced in the Canadian Atlantic fisheries for the past forty years.

Production was greatly curtailed, particularly during the first eight months, due largely to the low prices prevailing for catches. In many districts operations were almost wholly suspended, and the fishermen, whenever possible, engaged in other occupations. Dealers ceased buying. The prices for the small catches secured were exceptionally low, ranging from 80 cents per cwt. for fresh haddock to \$1.25 for fresh cod. These prices were unprofitable to the fishermen, and in some instances not sufficient to pay operating expenses.

The general marketing conditions for fish products were unfavourable, and made impossible any large or steady buying on the part of its dealers, whose efforts were chiefly confined to disposing of the supplies left over from the preceding year. The markets very considerably improved the past four months, and the stocks on hand absorbed, with the prospect that the coming year will see a resumption of the activities both from a producing and export point of view.

The untoward conditions above referred to, together with a lack of employment in other industries, caused considerable hardship to the fishermen of many districts.

Fortunately, the past few months there has been a gratifying improvement, and ready markets were found for the catches of all varieties of fish. Indeed, some of the principal dealers in fresh fish had difficulty in securing suitable supplies to fill orders for Quebec and Ontario markets.

The following review may be found of interest and value:—

## NOVA SCOTIA

In this province, Halifax and Guysboro county and the island of Cape Breton were hard hit by the lack of market activities and the consequent low prices for the catches, with the result that the landings of the hand-line fishermen were small. To add to the general embarrassment, the usual run of spring and summer herring failed, the catches not being sufficient to furnish a satisfactory supply of bait. Shelburne and Queens were the most favourably situated during the summer season, as the buyers at Liverpool, Lockeport and Shelburne were paying as high as \$4.50 for market cod. Some of the fishermen in these districts had a successful season.

The lobster fishery was the one bright spot, particularly in western Shelburne, Yarmouth and Digby. The regular season of three months from March 1 was the most profitable in the history of the industry. The weather was uniformly good, in some instances the fishermen hauled their traps regularly every day throughout the season. The catches were large, and of good quality. While the prices for "shorts" were only one-third that of the preceding year, the increased catches and fair prices received for live shipments more than equalized the low prices for the small lobsters. The district east of Baccaro, Shelburne county, to Guysboro, and also Cape Breton island, was not as advantageously situated, as the prevailing winds which obtained in Shelburne, Yarmouth and Digby were unsuited for the best results in the eastern district.

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*District No. 1, Cape Breton.*

The general conditions in this district were the most unsatisfactory in the history of the industry for many years. While fish of all kinds were plentiful, the low prices and poor market conditions prevailing throughout the whole season prevented operations being carried on with any degree of profitable zeal.

The lobster fishery was particularly disappointing, the catch being only 36,215 cwt., which shows a decrease in the catch of 19,675 cwt., as compared with 1920. The chief cause affecting this fishery was the low prices paid to the fishermen, which were less than one-half those prevailing in 1920. This resulted in many of the fishermen operating only a portion of the season and in a half-hearted way, as the cost of operations made reasonable, profits impossible. Forty-nine canneries were in operation, or five less than in 1920.

The herring catch shows a decrease of 3,116 cwt. as compared with the preceding year. The decrease is attributed to the scarcity of herring on the Inverness coast. Herring was very plentiful on the Richmond county coast but as the prices were unusually low and the cost of salt and barrels high, the fishermen did not prosecute this industry with much zeal.

The haddock catch shows a decrease of 42,569 cwt. compared with 1920.

The mackerel catch shows a decrease of 10,260 cwt. as compared with the preceding year. In Inverness there was a decrease as the mackerel only struck the coast off Inverness harbour. Isle Madame, Richmond county, shows a decrease of 7,913 cwt., while L'Ardoise shows an increase in the catch of 3,366 cwt. The catches were disposed of at good prices and the expense of curing was less than in 1920. The increase in the catch at L'Ardoise was due to favourable weather conditions which brought the fish more inshore and gave the poorer class of fishermen who were not equipped with motor boats, a good opportunity to operate.

The smelt fishery shows a marked increase in the catch, the quantity being 2,194 cwt., as compared with 571 cwt. for 1920. The prevailing price, however, was only \$3 per cwt.

The oyster fishery shows a substantial increase, the catch being 1,195 barrels as compared with 725 barrels the preceding year.

*District No. 2, Nova Scotia East.*

The industry was carried on with a comparatively fair measure of success. The weather conditions throughout the year being good, the fishermen were able to carry on operations without undue loss of gear.

The lobster catch was 48,428 cwt., which shows a decrease in the catch of 12,625 cwt. It should be noted that the average price for the catch in 1920 was 10 cents per pound, while in 1921 the average price was only about 5 cents per pound. With the exception of 1918 the catch was the smallest for over ten years.

The decrease in the catch was general throughout the district except in Cumberland county, where there was an increase of over 100 per cent in the catch and pack during the regular fall season, from August 16 to October 15. The spring catch in that county shows a considerable decline due to four canneries being closed. Halifax county west shows a slight increase, accounted for by the special fall season.

The explanations of the decrease are scarcity of fish and low prices. Three hundred and eighty-four more lobster fishing licenses were issued than in 1920, and of 63 cannery licenses issued 58 operated, but in Antigonish county, where 10 canneries were operating at the first of the season, only four continued up to June 1, and at the end of the season only two were operating. Scarcity of bait was noted especially in Pictou and Antigonish counties. All along the shore traps were taken ashore before the season closed, and on the whole the spring seasons in this district were not successful.

The regular fall season, Cumberland county, was very successful and both packers and fishermen did very well—3,857 cwt. was the fresh catch compared with 1,771 cwt. in 1920; the pack was 1,815 cases compared with 881 cases. The market for canned lobsters improved towards the end of the year, and some packers obtained as high as \$30 per case.

One noticeable feature in fall packing was the high average quantity of lobster required to produce a case of 48 pounds of the canned product. This is due to the lobster being poorly meated after moulting, and the new shell not being hardened or filled out. In some cases as much as 235 pounds of fish was required to pack a 48-pound case.

The pack by counties was as follows:—

Cumberland.. . . .	4,379
Pictou.. . . .	7,707
Antigonish.. . . .	3,545
Guysboro.. . . .	3,895
Halifax.. . . .	1,346
<hr/>	
Tomalley.. . . .	20,872
	554
<hr/>	
	21,426

The catch of cod shows a general increase about 20 per cent greater than in 1920, with a decrease in value. The average price for 1920 was \$2.17 per cwt., while for 1921 it was only \$1.51 per cwt. Owing to steam trawlers operating from Halifax landing their catches at Portland, Me., the catch for Halifax shows a decrease in haddock, hake and cusk. The shore fishermen in Halifax, however, had an increased catch.

The haddock catch shows a decrease of 31,030 cwt. The decrease in the catch was in Halifax and Guysboro counties, the catch on Northumberland straits and the Bay of Fundy being about equal to that of 1920.

The herring catches have been decreasing in this district since 1918, the catch for the past year showing a decrease of 4,946 cwt. as compared with the preceding year. The decrease in Cumberland and Pictou counties, in the Northumberland straits district, was about 8,000 cwt. Guysboro shows an increase of 9,793 cwt., while Halifax shows a decrease of 7,446 cwt. Market conditions were not good, as large quantities of smoked herring were in stock from the previous year and had to be disposed of at a loss. Large supplies of Newfoundland herring were also on the market.

The mackerel catch shows an increase of 7,526 cwt., or 28 per cent, as compared with 1920. Guysboro county shows a decrease of over 5,000 cwt., due largely to the dog-fish pest, which prevented fishermen from setting their nets when the fall mackerel were running. Halifax shows an increased catch of 13,000 cwt., due largely to the big schools of small mackerel appearing on the coast during the spring and summer. The catch of large mackerel was fair, and as there was great competition among the buyers the fishermen obtained excellent prices, ranging from 15 cents to 40 cents for each fish. Thirty thousand pounds of mackerel were taken in the Bay of Fundy waters of Cumberland county. This is an unusual occurrence as mackerel seldom reaches the head waters of the bay.

The salmon catch shows a most encouraging increase of 1,475 cwt.

The smelt catch shows an increase of 1,289 cwt. Albacore shows a decrease of 483 cwt. and about 50 per cent decrease in the price. The decrease is accounted for from the fact that the American market, to which the fish are shipped, was heavily supplied by large landings taken on the American coast, consequently fishing operations were not nearly so active as during 1920.

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*District No. 3, Nova Scotia West.*

The general conditions were fair and the fishermen suffered to a less extent than in other districts.

*Lobsters.*—The weather conditions during the regular fishing season from March 1 to June 1, were most favourable, particularly for the large producing counties of Shelburne, Yarmouth and Digby, where the fishermen were able to haul their traps with hardly a day's loss throughout the whole season. With the exception of Kings county, where the catch rarely exceeds 250 cwt., every county shows a substantial increase.

The catch for the three months was 113,657 cwt., as compared with 95,948 cwt. for 1920. To this should be added the catch for the special season from November 1 to December 15, amounting to 32,733 cwt., or a total catch of 146,390.

\*The catch and pack by counties was as follows:—

	Catch	Pack
Lunenburg.. . . . .	5,151 cwt.	455 cases
Queens.. . . . .	8,219 "	465 "
Shelburne.. . . . .	46,283 "	11,520 "
Yarmouth.. . . . .	63,549 "	14,675 "
Digby.. . . . .	21,389 "	3,541 "
Annapolis.. . . . .	1,596 "	.....
Kings.. . . . .	203 "	.....
	<hr/> 146,390 cwt. <hr/>	<hr/> 30,656 cases <hr/>

The cod landings were 1,077,581 cwt. as compared with 1,127,622 cwt. the preceding year. This shows a decrease of 50,000 cwt.

The haddock and hake catches also show very considerable decreases in the catches, the total decrease being 127,671 cwt.

The herring catch was reduced by nearly one-half, or from 113,763 cwt. in 1920 to 61,419 cwt. in 1921. From some unknown cause the usually heavy spring run failed to make an appearance.

It is gratifying to report that there were substantial increases in the catches of mackerel, halibut, smelt and salmon. The mackerel catch was 28,726 cwt., or an increase of 13,095 cwt. The halibut catch was 20,624 cwt., or an increase of 7,317 cwt.

## NEW BRUNSWICK

In New Brunswick the lobster, smelt, salmon and oyster fisheries were the outstanding features. The smelt catch was 62,000 cwt. This valuable fishery is confined almost entirely to the four northern counties of Restigouche, Gloucester, Northumberland and Kent—Northumberland being the chief centre. This fishery is a most lucrative one to the fishermen, it being not unusual for the better placed netsmen to land \$500 worth in a single week. During the last season two men, operating together, disposed of \$1,600 worth as the result of four weeks fishing.

*District No. 1, St. John and Charlotte Counties.*

The lobster fishery was successfully prosecuted throughout the season, the catch of 9,012 cwt. being slightly greater than the catch for 1920. The value of the catch, however, shows a decrease as compared with the returns of last year. The catch is disposed of alive in the United States, as no canning is carried on in this district. The reduced value is attributed to the heavy supplies shipped from western Nova Scotia in May, and also to the shipments during the special season of six weeks from November 1.

*Sardines.*—The catch of 152,300 barrels was the smallest for some twenty years. The value to the fishermen was only \$1 per barrel. The following statistics for the four years, 1918-21, will show the seriousness of the situation:—

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	Catch	Value
1918.. . . . .	295,753 brls.	\$1,478,963
1919.. . . . .	214,510 "	276,565
1920.. . . . .	196,562 "	284,533
1921.. . . . .	152,300 "	160,783

It should, of course, be noted, that the heavy returns for 1918 were due to the abnormal conditions existing, when every possible effort was demanded to increase production, with a consequent rise in prices, the fishermen securing as high a rate as \$70 per hogshead of five barrels. Owing to the disorganization of the canned sardine trade the packers were unable to market the packs of 1918 and 1919, with the result that the following years the pack was light and therefore there was little demand for the catches. At the present rate of \$5 per hogshead, the fishermen have been heavily hit, as many of the weirs cannot be remuneratively operated at that price.

*Herring.*—The catch was 116,263 cwt., as compared with 236,358 cwt. the previous year. The catch was almost wholly in Charlotte county, where the greater portion is used for the smoked trade. It should be noted that the catch of 1920 was much larger than usual. This resulted in the markets becoming demoralized and smoked herring being disposed of at less than cost of production. The markets, however, are now showing good signs of improvement and there is every prospect that the important smoked herring industry of Grand Manan will be revived.

*Salmon.*—The catches of the net fishermen were the greatest for many years, being 4,150 cwt. as compared with 1,375 for the previous year. The increase is attributed to the abnormal dry weather conditions, which affected the rivers, keeping the fish in the coastal waters, thus enabling the netsmen to secure large catches.

*Alewives.*—This fishery declined from a catch of about 13,000 barrels in 1920, to 3,250 barrels the past year. No satisfactory explanation has been given. It will be interesting to note the returns for the coming year, as it is possible that the fish ascended the rivers in the early spring freshets.

*District No. 2—From Albert and Northumberland Counties to the Quebec Boundary.*

The conditions in this district were, on the whole, quite satisfactory.

The lobster catch was 59,453 cwt. The pack was 22,356 cases. The catch for the preceding year was 55,711 cwt.

The smelt catch was 62,041 cwt., as compared with 39,938 cwt. the preceding year. The average price secured by the fishermen was 8½ cents per pound.

The cod catch was 75,361 cwt. The herring catch was 135,975 cwt.; 21,000 cwt. of mackerel were taken.

The tomcod or "frost fish" catch is noteworthy, the catch being 18,730 cwt. This fish, highly prized by many people as a good pan fish, has not yet been popularized in Canada, although considerable quantities are disposed of in Montreal. The catches are disposed of chiefly in the United States. The fishermen received only about \$1.50 per barrel and therefore little interest was taken in the fishery, the catches of which could be very greatly increased.

It is particularly interesting to note the large increase in the salmon catch. About 15,658 cwt. were taken. The catch the preceding year was 8,152 cwt. Record catches were made in the outside waters by the drift boats. The nets operating for hatchery purposes secured 3,200 fish from sixteen nets in six days. Large quantities of the catch were shipped to England.

*District No. 3, Inland waters.*

This district is confined to inland fisheries only, the principal waters being the St. John river and tributaries, and comprise salmon, alewives, pickerel, sturgeon, whitefish, shad, bass and eels. The total catches amounted to 3,126 cwt. This shows an increase of 1,506 cwt.

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It is interesting to note that 2,055 cwt. of shad were taken the past year. Owing to depletion this fishery was closed for the three preceding years. The quantity taken the past year was about double that taken in 1917 and it is hoped that the revised regulations, which will probably be effective next season, will result in safeguarding the fishery for many years.

The waters of this district constitute most important and valuable breeding grounds, besides affording abundance of sport fishing for the large number of visitors each year.

## PRINCE EDWARD ISLAND

While there was a slight decrease in the total catch, the values greatly decreased as compared with the previous year.

*Lobsters.*—The catch was 63,816 cwt. The following statistics will reveal the heavy losses, both in catches and prices. It will be noted how large a part the lobster fishing and canning industry play in the industrial and economic life of the district:—

	1920		1921	
	Cases		Cases	
West Prince.....	8,933	\$ 311,037	7,382	\$152,040
East Prince.....	7,086	234,357	6,016	121,021
Queens.....	7,818	280,626	5,969	122,190
Kings.....	16,485	555,454	11,788	239,493
	<u>40,322</u>	<u>\$1,381,474</u>	<u>31,155</u>	<u>\$634,744</u>

It is particularly gratifying to note that the value of the campaign of instruction carried on the past several years for improving the quality of the Island pack has exceeded expectations. The quality has greatly improved. Much of the success is due to the lively interest taken by the canners, who actively assisted the efforts of the instructional officers and experts in every possible way.

*Oysters.*—The catch was 3,792 barrels, valued at \$25,669, as compared with 2,775 barrels the preceding year. The outlook for this fishery is good as the catches of spat were excellent, resulting in bedding East and West rivers, Orwell, Vernon and Seal rivers with an abundance of small oysters.

## THE LUNENBURG FLEET

The landings of the Lunenburg fleet were most gratifying, amounting to 269,830 quintals, as compared with 291,475 quintals in 1920, which was the largest catch in the history of the industry. The decrease was due wholly to the smaller number of vessels engaged, only 94 being employed, as compared with 117 in 1920. As a matter of fact, the average catch per vessel was greater than for many years.

The lack of the usual early spring operations accounts for the reduced total catch, as only five vessels engaged in early spring fishing, landing only 3,300 quintals, as compared with sixty-eight vessels in 1920, landing 30,000 quintals.

Under normal conditions the catch for 1921 would have greatly exceeded any catch in the history of the fleet. The drop in the prices since 1919, and the continued high operating expenses, taken together with the considerable supplies on hand from 1920, were the causes in the curtailment of operations.

The first six months of the year dried fish could hardly be disposed of at any price. In some instances the shore fishermen had to sell at \$4. The local and export markets gradually revived, and during the past month sales were made at \$7.

The preparations for 1922 are active, and will put a much larger number of vessels in commission.

## THE LOBSTER FISHERY

Special attention has been given to the lobster fishing and canning industry and a very lively and wholesome interest developed. When it is pointed out that the catch the past year was 393,625 cwt. and that the pack was 137,607 cases, the whole having a marketed value of \$5,143,403, it will be seen that the lobster fishery, with the exception of the cod fishery, is the most lucrative and valuable of the Atlantic fisheries, particularly when it is remembered that the rate of the catch was less than half that received in normal years.

The fishery is, however, subject to great danger, as it lends itself more readily to unwise exploitation. The fishing seasons are comparatively brief, the returns immediate and lucrative. For the past several years a firm stand was taken against any extension of the fishing seasons, with the result that the balance between the catch and the natural increase was fairly well maintained.

On representations that the exceptional low employment condition of the past year, together with the low prices prevailing for the catches of the deep-sea fisheries—a special lobster fishing season from November 1 to December 15 was granted to the southwestern district from Cole harbour to Minas basin. This has been of little value to the fishermen, as the fish were not in good condition during a considerable portion of the special season. The shedding of the shell was too recent, with the result that the shell was thin and the meat poorly developed. The lobster was, therefore, weak, and the percentage of losses much greater than during the regular fishing season. A majority of the canners operating did so with reluctance, as the extra season endangered the stability of the markets, which were favourable for the disposal of the regular pack. A number ceased operating after a few weeks, owing to the fish not being in good condition. As a result of the poor condition of the fish, the live lobster trade was most unfavourable. The American markets were already well supplied, and the shipments during the special season hardly paid the expenses. Many of the fishermen who were vigorously opposed to the special season did not operate, while a large number took their traps ashore some weeks before the close of the season.

A further detrimental effect was that the fishermen of Charlotte and St. John counties, New Brunswick, suffered severely by the shipments of poor quality lobsters from Nova Scotia. Last year the opening price for the New Brunswick catch was 39 cents per pound. This fall the price was 13 cents per pound. The special season was, therefore, not only unprofitable for the fishermen but involved a serious economic loss.

While the special season may have been justified, the results here clearly show that its value to the fishermen was not at all commensurate with the economic loss caused by the unsuitability of the season, and the poor condition of the catch.

The lobster fishing and canning industry requires stabilization, and every possible action should be taken to this end. It is impossible to stabilize the industry unless the fixed fishing seasons are adhered to. Every canner, to a man, and many of the more prominent fishermen of the important fishing districts are strongly opposed to additional fishing seasons, or to any extension of the seasons.

Further, there is a noteworthy growth of opinion on the part of the fishermen, particularly of the coast west of Halifax harbour, in favour of prohibiting the slaughter of small lobsters, by the enactment of a size limit regulation. Halifax county is practically unanimous in this regard, and Lunenburg county gives the proposal of the Prospect district fishermen most hearty support.

Digby county fishermen have also taken action in the matter. The Bay of Fundy shore of that county is now operating under a size limit regulation, which was adopted at the request of the fishermen. At Cape St. Mary's where the fishermen operate a Union cannery, the fishermen are unanimous for a size limit, notwithstand-

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ing that the limit of nine inches proposed by them would put their factory out of business. Within the past few weeks the fishermen of Westport and other important lobster fishing centres placed themselves publicly on record as favouring the protection of the small lobster.

St. Mary's bay is one of the best natural breeding grounds on the coast, and with proper protection the lobster fishery of the bay can be very greatly enhanced in catch and value. The fishermen are alive to the advantages to be obtained by conservation, and their deliberate expression of opinion in this respect is an evidence of the high value they place on the fishery as a resource of prime importance.

## THE OYSTER FISHERY

The oyster fishery is in an unsatisfactory condition. The total catch was 18,823 barrels. While the catch exceeded that for some years past it is only equal to the catch from the New Brunswick areas in 1900. As quickly as opportunity and circumstances afford a complete survey of the areas should be made, with the object of securing better control of the industry and the development of many hitherto unworked or little known areas existing along the whole coast, as well as working out a more satisfactory arrangement with the provincial authorities in connection with leasing for cultivation, and the defining of boundaries for mussel-mud digging. The farming population in the vicinity of the best areas in New Brunswick and Prince Edward Island highly prize the mud for fertilizing purposes and continually press to have the boundaries extended, with the result that digging operations are constantly encroaching on the live areas.

It is planned that a preliminary survey be made the coming summer for the purpose of ascertaining the possibilities and needs of the fishery. It may be pointed out that while the conditions in connection with the areas at Buctouche and Shediac, New Brunswick, and Malpeque and Richmond Bay, Prince Edward Island, are well known, little attention has been given to other portions of the coast where oysters of fine quality exist. In Nova Scotia there are productive areas at Ostrea lake, in Halifax; Tracadie, in Antigonish; Merigomish, and Cariboo harbours, in Pictou; Tatamagouche bay, in Colchester, and Wallace bay and Pugwash river in Cumberland. In Cape Breton, catches in fair quantities have been made at Orangedale and River Dennys in Inverness; St. Patrick's channel, Washabuck, McKinnon's harbour and Estmere in Victoria county.

It would appear that reasonable efforts for the preservation and development of this fishery would be fully warranted.

## RIVER AND INLAND FISHERIES

The river and inland fisheries have not been overlooked, as they are not only of great value from a sport fishing point of view, but are quite essential in connection with netting operations carried on for the catching of salmon, smelts, alewives and other anadromous fishes. Many thousands of the residents and visitors find their recreation in the river fisheries. With proper exploitation it should not be difficult to very greatly increase the wealth of the river districts as a result of the increase of sport fishing.

The difficulties with regard to adequate protection should be appreciated. It is quite impossible at the present time, under any system of administration, to employ a sufficient force of officers to protect the innumerable rivers, streams and lakes of the Atlantic provinces. The best that can be done is to give reasonable protection to the more important streams. With the sparse population and the remarkable network of inland waters, illegalities are bound to occur. The impossible should be recognized.

The past year was not as favourable for sport fishing as former years. The extraordinary drought lowered the waters in the rivers and lakes, resulting in conditions that prevented successful angling. While considerable quantities of salmon ascended to the spawning grounds during the early freshets, the fish either continued in the coastal waters or remained in the lower pools where they showed little inclination to take the fly. Trout fishing was, however, quite good throughout the season.

The rivers have been kept free from obstruction and the fishways well looked after. Considerable work in this respect will be required this year as a number of the fishways on important streams will require to be either repaired or rebuilt. The operations of the saw and other mills have been closely watched, with the result that the rivers and streams are well protected from pollutions.

#### PATROL BOATS

The number of patrol boats employed at the beginning of the year was twelve. In view of the need of economy the steamer *Nelson*, operated at an annual expense of about \$9,000, was laid up and finally disposed of. This boat will not be replaced. Patrol boat *F*, Western Nova Scotia district, will not be operated the coming season.

With hardly an exception the boats were operated with greater satisfaction and value than for the past ten years. The machinery and equipment was kept in good order by the motor engineer, and little or no loss of time was incurred in repairs. While there were considerable seizures of illegal fishing gear, the operations of the boats were highly effective in preventing illegalities and assisting the shore officers in adjusting difficulties among the fishermen.

#### THE INTERNATIONAL SCHOONER RACE

The second International fishing schooner race was held off Halifax on Saturday and Monday, October 22 and 24, and enlisted very great interest, visitors being present in large numbers.

The challenge race was preceded by the usual beautiful and spectacular Canadian elimination race for the selection of the challenger, and was won by the Lunenburg schooner *Bluenose*, in charge of Captain Angus Walters, of Lunenburg.

It will be remembered that the challenge race of 1920 was won by the American schooner *Esperanto*, in the contest with the Canadian, *Delawana*.

The first race, Saturday, October 22, was over a course of 39.3 miles, starting from the Halifax breakwater. The American schooner *Elsie* crossed the starting line at 9.00.10, followed by the *Bluenose* at 9.00.49, and after a most exciting race, during which the *Elsie* kept the lead over a considerable portion of the course, she was beaten out by the *Bluenose* crossing the finish line at 1.33.05, or 12½ minutes in advance of the *Elsie*.

The second race, Monday, October 24, the *Elsie* again being first to cross the starting line—9.00.32—the *Bluenose* following at 9.01.52. For nearly three hours the Gloucester schooner had the *Bluenose* trailing in her wake, but the Lunenburg schooner showed her quality on the homeward stretch and crossed the finish line at 2.21.41, followed ten minutes later by the *Elsie*.

These races have awakened intense interest and will doubtless result in evolving a type of fishing schooner well adapted for both the salt and fresh fish fisheries.

#### SERVICES OF THE R.C.M.P.

Expression should be given to the valuable services rendered by the Royal Canadian Mounted Police, in assisting in protecting the fisheries of Prince Edward Island and in apprehending violators of the law at a number of points throughout the division. In several instances, where every local effort failed, the police succeeded in rounding up offenders. Inspector LaNauze has been most courteous and prompt in his assistance.

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## ADMINISTRATION

The past two years have without doubt been the most trying period in the industry for forty years, with the result that satisfactory administration has been difficult, particularly when it is remembered that the organization of the Atlantic Division was coincident with the general demoralization affecting the fishery, and that the organization involved changes necessitating the employment of a staff of officers with little or no experience in the business. It could not therefore be reasonably expected that the new officers could secure in so short a time a satisfactory grasp of the many intricate, highly involved questions constantly arising. Much progress has been made in their training, although the permanent staff is not yet complete, as a number of the first appointees were found unsuitable and had to be released.

A most promising feature of this service is the evident desire of the officers to "make good". The inspectors speak highly of their zeal.

It will be of interest to note that the number of employees, chiefly special guardians, has been reduced by about three hundred, without any loss of efficiency in the service. Indeed, the consensus of opinion along the coast is that there has been a vast improvement in this respect, notwithstanding the fact that the staff of new officers have hardly passed the A B C's of their training.

The course of instruction given at Charlottetown, P.E.I., in September last, was most valuable, and included "Address and demonstrations on the growth of Bacteria", "The migration of fishes", "Demonstration on the curing and packing of pickled fish".

A conference was held with the lobster packers, at which a most informing address was given by Mr. W. F. Tidmarsh, Charlottetown.

In addition, the chief inspector held over thirty conferences with the fishermen, packers and dealers, all of which was of very great advantage from an administrative point of view. The fishermen were particularly appreciative and gave evidence of a much increased interest in the service generally.

Twenty thousand seven hundred and fifty-three licenses were issued during the year, and 290 prosecutions undertaken for infractions of the Fisheries Act. The duty of the officers in enforcing the regulations is not a pleasant one, but is quite essential not only from the fishery protective point of view, but also in the interest of good citizenship generally. One law easily evaded brings other laws into contempt. An unpunished lawbreaker comes to hold himself above the principle of the "Greatest good to the greatest number" and this results in appeals for special privileges, to the detriment of the general public. Happily, many of the fishermen are becoming the best advocates of law observance, with the result that illegalities are not as prevalent as in the past. This is particularly true with respect to the valuable lobster fishery. In several of the more important districts illegal fishing has practically disappeared.

## DEVELOPMENT

The general development of the industry must in the nature of things depend quite largely on the export trade. While there is no limit to the possible catch of deep-sea fish, particularly cod and haddock, the fact remains that the catches from these fisheries must be coincident with the expansion of the markets. There is no doubt that a large fleet of trawlers could secure heavy and steady catches, but experience has shown that the present market demands are not equal to the possible catches of the five trawlers now in the service. Indeed, the past year the fresh fish markets could not absorb ordinary catches, with the result that the trawlers have either to be laid up for about six months each year, or put in the salt fish trade, or otherwise employed. It is safe to say that every possible profitable market is being carefully exploited. The development of the deep-sea fisheries must depend on the

ability of the markets to absorb the catches. It is therefore beside the mark to lament the lack of very large development either in the catches or fishing equipment, as the development of our fisheries must go hand in hand with the development of the markets.

It should be pointed out, however that several districts, particularly on the Cape Breton coast, are sadly handicapped by the lack of cold storage, salt supplies and satisfactory transportation facilities. While it has been urged that salt depots and cold storage facilities should be furnished by the department, the wisdom or practicability of such course is very greatly to be doubted, as experience has shown that any proposition of this character that can be based on sound business practice, will be looked after by private enterprise, otherwise the difficulties and embarrassments are obvious.

Opportunities are constantly arising for the utilization of little known products of the sea. For instance, a side line of considerable promise developed in Grand Manan the last year in connection with the smoked herring industry. In this trade, which is a large one, it is necessary to remove the scales from the fish before salting for the smoke-house. The scales were a waste until last summer a New York company, engaged in the manufacture of artificial pearls sent their operators into the district and purchased large quantities of the scales, for which 5 cents per pound was paid. The total amount expended was \$17,000, and it is contemplated to very greatly increase the business the coming year.

Also, inquiries have been made as to the possibility of securing large quantities of dulse, for which a ready market is assured. For some years past considerable supplies have been gathered, chiefly at Grand Manan, N.B., and Digby, Nova Scotia, although a good quality of dulse may be easily secured at many points along the Atlantic coast. About 1,000 cwt. was prepared for the market the past year, the value of the catch at Grand Manan being \$5,880. It is reported that prospects of developing a value of at least \$50,000, is probable. The usual method of taking and preparing dulse for market is to strip it from the rocks at low tide, and sun-dry for several days. This method of preparation is crude, as the production of the best quality depends upon perfect weather conditions. Doubtless with the probable development of the industry, artificial drying methods will be introduced.

It will also be interesting to note that an American firm, known as "The Marine Fish Products", are operating at the old Government Reduction plant, Canso, manufacturing fish meal and fish oil from dog-fish. Fish meal, which contains a high percentage of protein (about 80 per cent) is used mixed with other brands of meal, for cattle feed, and has a ready market, at a fair price. Fishermen were paid \$6 per ton for dog-fish landed at the plant. A sufficient supply, however, could not be obtained the past year to make the operations the success anticipated. The lack of raw material was due to prevailing weather conditions during the run of dog-fish, as well as to the lack of a sufficient number of fishermen engaging in the catching of the dog-fish.

In view of the large investment in the fisheries of the province, and also in view of the large turn-over each year, and particularly in view of the fact that the industry gives direct employment to over 40,000 persons, and employment to a very considerable number in allied industries, it is obvious that it occupies a very important economic position. A study of our shore population will make clear the large part the fisheries play in the life of the province. Important towns and villages all along the coast are wholly dependent on the fisheries for their existence, while large stretches of the coast now thickly settled, would have remained unpopulated. Every endeavour to lighten the burden of the fishermen; to safeguard their interest, and to encourage the industry would be justified.

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## REPORT OF INSPECTOR J. E. BERNIER, M.D., ON THE SEA FISHERIES OF QUEBEC FOR 1921

I have the honour to submit my report regarding the fisheries of the Gulf Division for the season just closed.

Such season is specially remarkable for the fact that following the decision rendered by the Privy Council and dated November 30, 1920, the Federal Government was given authority of assuming the administration of the fisheries in the waters accessible from the sea by way of navigation and which had been previously placed under the jurisdiction of the provincial authorities. Such measure affected all the fishermen established along the St. Lawrence from Montreal to the gulf, as well as those inhabiting the peninsula of Gaspé. It was easy to foresee, from the very outset, that its application would be such as to raise a strong opposition, in all quarters, on their part, since they were to be compelled to take out two permits to keep their fishing apparatus in operation.

It became necessary, following short preparations, and with an untrained staff, to give the right direction to the service in such a way as to molest in the least possible way those affected by that change of administration, and show an attitude tending to strongly impress the public with the necessity for all to comply with the directions of the Order in Council dated April 20, 1921.

The fishery overseers were instructed:—

1. To renew, in the name of the same persons, all the fishing licenses granted the preceding year.
2. To require that all the fishermen, without any exception, take out licenses from the Department of Marine and Fisheries, such as provided by the new regulations.
3. To use all reasonable means with a view to inducing them to comply with same;
4. To never have recourse to rigorous measures before having exhausted all possible means of persuasion.
5. To ignore the pretensions of the Provincial Government concerning the jurisdiction of the fisheries and to avoid to get involved in any argumentation with anybody in connection therewith.

Owing to their tact, good behaviour and broadmindedness, the fisheries overseers succeeded in imposing a satisfactory control without exciting much discontent, or interfering with the fishermen's undertakings. In five cases only it was necessary to take legal proceedings against those refusing to comply with the regulations.

The *Loos* being ready to put to sea on May 12, I left Quebec to undertake the regular service and assume direction of same as in former years. Taking advantage of the information gathered, I devoted all my attention to the places where the fishermen, under the influence of erroneous directions, intended fishing without any other permits than those they had procured in the past. I advised them promptly to change their decision by indicating to them all the annoyances and inconveniences which might result from such an attitude, and afterwards, until the end of the season nothing particular happened in that connection.

The fishing industry continues to be demoralized by the unfavourable circumstances resulting from the abnormal conditions of the markets. The value of the total production compared with that of 1920 has decreased by about \$1,000,000.

The number of fishermen was less than that in the preceding year by about 8 per cent. The fishing apparatus and implements are not being renewed; the boats rendered useless are not replaced, and no less than 400 remained inactive during the last season. These conditions seem to deserve serious attention.

The following is a summary of what I noted throughout the different sections of my district where the principal species of fish caught are: cod, lobsters, herring, salmon, mackerel and smelts.

## COD

The low prices offered for that fish as well as the high cost of all the necessary articles and goods have strongly contributed to discourage a considerable number of fishermen who made all the efforts possible to find elsewhere more remunerative occupations. Those who persisted in their old vocation were compelled to do so because they failed to procure some other employment.

In the Canadian Labrador, cod appeared in large schools during June and July. The seventy schooners from Newfoundland which resorted to that coast at the regular time, obtained much success, havy re-sailing with complete cargoes og fish. The Canadian fishermen not impeded by illness from devoting their time to the fishing operations made also important catches. The yield in that section is greater than that of last year. The fishermen were specially favoured by the absence of ice as well as by fine weather.

From the mouth of the Saguenay as far as Natashquan, the fishermen did not carry on any fishing operations, till about the middle of the season. They were then improperly equipped and did not show much activity. The yield was poor. The unsatisfactory results obtained must be attributed to the prices, shamefully low, paid for dried cod, and which amounted to \$2 or \$4 per hundredweight, while the fishermen of the South Coast received from \$7 to \$11 for products of the same grade.

In the county of Gaspé, from Fame point to cap Chat, the cod fishing operations were conducted with much energy. The fishermen of that district have taken to the habit of exporting themselves their products to Europe, through the banks, and of keeping themselves closely connected with the conditions of the markets.

More circumspect, better informed, and less subordinate to the dependence of the fish dealers than those of other portions of the district, they foresaw that good results could be derived from marketing their fish products and this explains why they devoted themselves with such zeal to their fishing enterprises, and the remarkable success which resulted therefrom.

In the other part of the county of Gaspé, at Magdalen islands and in the county of Bonaventure, the yield was inferior to that of last year, which is due to the low prices offered to the fishermen, from the very outset of the season. Such a state of things tended to discourage a certain number of them who applied themselves to some other ocupati/ us.

## LOBSTERS

The lobster fishery was below the average. At Magdalen islands, the total production only amounted to 12,178 cases, against 16,618 cases in 1920. It would, however, be premature to conclude that such a decrease in the output is a sign of depletion. In consequence of the unfavourable conditions of the market and the high cost of the material necessary for carrying on fishing, the operators of the lobster factories thought it wise during the preceding winter to reduce their preparations in comparison with those undertaken in the past. The decrease of lobster traps in operation and the violence of the winds, during the months of May and June, may be regarded as the principal causes of the failure in this fishery.

Along the coast of Gaspé and Bonaventure, a decrease has also been recorded, while in the Canadian Labrador, the production has varied little.

## HERRING

The spring herring appeared in large schools all along the northern part of the St. Lawrence gulf, but, unfortunately, our fishermen were not in a position to take advantage of their presence.

Up to the last years of the war, the sale of herring to foreign fishing vessels, which utilized them for bait in the cod fishery carried on on the banks, was a source

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of considerable revenue for the inhabitants of the Magdalen islands. Since then, as no markets can be discovered for smoked or salted herring, and as there are only a limited number of vessels from the United States, Nova Scotia and other countries visiting the islands, with a view to supplying themselves with bait, the islanders have no interest in carrying on this fishing, but for the purpose of feeding the local market. During the last season their fishing operations were necessarily limited, and as far as it may be foreseen, this state of things will continue for an indefinite period, that is, as long as no proper method of utilizing their catches has been discovered.

In the majority of cases their revenue was insufficient to cover the operating expenses; some fishermen could not even secure a sufficient amount of profit to pay their license fees.

In the Canadian Labrador, fall herring, usually in great demand on our market, was inferior in quality, and its production was rather small.

## SALMON

The statistics tend to show that the catch of salmon in the Gulf Division has doubled that of last year, having amounted to 7,805 hundredweights, compared with 4,929 in 1920. The cause of this increase cannot be explained.

If it is true to state that the general results were more encouraging throughout the different parts of the district where such fishing is carried on, it cannot be concluded that all the fishermen were equally favoured. As the water was very low and limpid in the rivers, from the very outset of the season, due to the lack of rain in spring, salmon ascended them without staying any appreciable time in the sea-waters, and consequently those having nets set in the estuaries of rivers and surroundings, were the only ones to effect profitable catches. The others operating stations usually fairly productive, but more distant, obtained so little success that the expenses exceeded the revenue they succeeded in deriving from such fishing births. These remarks apply especially to the county of Saguenay.

A fact worthy of mention which many seek to explain in a satisfactory way, without however succeeding to convince everybody, is that the size of salmon were much less on the average. In the counties of Bonaventure and Gaspé, they assert it has never been observed that the weight of salmon had fallen off to an average of 8 pounds before.

## MACKEREL

This fish which had deserted the waters at the entrance of Gaspé Bay, the surroundings of Seven islands and Baie-des-Chaleurs for a number of years, tends to re-appear in more and more considerable quantities. In the county of Bonaventure where the mackerel might produce great benefits, since it is possible to ship the fish by rail, in a fresh state, the inhabitants who had given up the habit of carrying on that fishery, are now devoting to it much more attention and to that end are undertaking to equip themselves with more modern fishing implements.

At Magdalen islands spring fishing was fairly profitable, while that carried on in the fall proved a complete failure, due to the unfavourable weather conditions. Raging winds did not cease blowing during the month of September.

The proceeds of the sale were very satisfactory. The appointment of a residing fish inspector at Magdalen islands contributes to improve the quality of all kinds of fish prepared there for the market. I have personally ascertained that that officer has undertaken a campaign of instruction among the fishermen, and I have been informed that his influence has already produced good results in connection with the salting of mackerel.

## SMELTS

The smelt fishery which cannot be carried on with profit but in the county of Bonaventure and in a portion of the county of Gaspé, that is to say, at such localities through which runs a railway line, has yielded 922 hundredweights more than last year.

Such results may be attributed to an increase in the number of fishing licenses granted.

## FISHING LICENSES

The following is a comparative statement of the fishing licenses issued during the two last seasons:—

Licenses	1920	1921
Herring (trap-nets).....	41	29
Cannery.....	3	3
Lobsters factory.....	71	75
Lobsters (fishermen).....	627	951
Salmon (gill-nets).....	155	347
Salmon (angling).....		16
Trout (gill-nets).....		5
Sturgeon (gill-nets).....		5
Cod (trap-nets).....	272	264
Smelts.....		193
Weirs.....		74
Hoop-nets.....		67
Seines.....		40
Night-lines (ligne de fond).....		55
Eel weirs.....		274
		<hr/> 2,416

The patrol season on board the Loos closed without any casualties, and we came back to Quebec on October 28.

Fishermen other than Canadians who appeared in small numbers on the coast of Labrador and Magdalen islands have faithfully complied with the regulations. The fisheries law has, in a general way, been well observed; in addition to the five prosecutions above mentioned, it was necessary to take eighteen further legal proceedings against certain fishermen of Port Daniel and surroundings for having not adapted their salmon nets as prescribed by Section 18, sub-section 6 of the regulations; one for having thrown saw-dust into Sainte Anne des Montes river, and two others for having used dynamite in Saint Jean river (county of Gaspé).

## REPORT OF CHIEF INSPECTOR G. S. DAVIDSON, PRAIRIE FISHERIES DIVISION, FOR 1921

I have the honour to submit herewith my annual report on the fisheries of the Central Division.

In the province of Alberta there has been a slight increase in the commercial catch over the year 1920. At the same time there has been a decrease in the number of fishermen operating, this latter was no doubt caused by the adverse condition of the markets in the first six or seven months of the year.

During the course of the summer the Mackenzie Basin Fisheries, Limited, commenced the erection of a cannery and salting and smoking plant on the shore of lake Athabaska, about twelve miles northwest of Black bay. A considerable amount of fishing equipment in the shape of motor boats, dories, scows was taken in to the site of the plant. The machinery for the plant was taken in and installed, actual canning operations commencing on September 14, the plant operated daily from that date until September 30, during which period the output was 645 cases of canned trout, 62 cwt. salted trout, twenty cases canned whitefish and ten cases of smoked

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whitefish, all of which I understand was shipped out to Edmonton. It is too early to make any statement as to the future success of this cannery. A market will have to be created and shipping facilities greatly improved, before, in my opinion, profitable competition with the long-established canneries can be maintained.

In the southern part of the province all reports received go to show that the closing of the trout streams for a period of two years has attained the desired result, and that fish are now more plentiful than in years past. It has been suggested that the streams within the limits of the forest reserves be closed to all fishing, if this action is taken, it will mean the preservation of the spawning and breeding grounds of the trout and the effect will be beneficial in all the southern district of Alberta.

In the province of Saskatchewan there was a slight decrease in the total quantity of fish taken for commercial purposes, also in the number of fishermen engaged in the work. This can be accounted for by the depressed condition of the markets earlier in the year, which resulted in the fishing companies holding off until such time as they could see clearly where the catch could be disposed of. I may say that the administration of the fisheries of this province has been eminently satisfactory during the year. The officers are all experienced and keen on their work, and have certainly given their best efforts to making a success of the supervision of their different districts.

It was found necessary to close Lowes lake to summer fishing for whitefish, this lake being the principal summer fishery in the province it was feared that it was being subjected to too heavy fishing and this course was taken in order to give it a chance to recover. The closing of this lake may have had some slight effect in lessening the total quantity of fish taken, but it was a necessary action and will well repay the present loss when again opened.

In the province of Manitoba, in spite of very precarious market conditions during the first six or seven months of the year, there has been an increase in catch. For the past four or five months the market has steadily improved, so that where a loss was anticipated a certain amount of profit was found instead. Sturgeon fishing was carried on during the winter in the Churchill river for the first time. These operations were not successful to those engaged in them owing to the difficulties encountered in transporting the catch from the fishing grounds to the nearest shipping point, however, there was no loss by waste of fish, I am glad to say.

During the month of June, the Assistant Deputy Minister of Fisheries visited Winnipeg and Winnipegosis, where he met a large number of delegates, appointed by the fishermen of those districts and with them discussed certain changes in the regulations which they desired. Practically all of these changes were granted. At these meetings the fishermen were shown clearly that it was the desire of the department to show them every consideration, and to advance their interests in every way, compatible with the proper preservation of the fisheries. This fact I feel sure the fishermen fully realized.

In general I may say that the reorganization of the fishery service in the Central Division was completed during the year, and it is already noticeable that this reorganized service is doing good work and is working smoothly. The officers are helping the fishermen to the best of their ability; showing them that they wish to co-operate with them in bettering the fishing industry in every way; urging them to place their catch on the market in the best possible condition; and teaching them that observance of the regulations is solely for their own benefit. While there is in certain districts a certain amount of illegal fishing, I think that this condition is improving, wherever it is sharply checked and the examples made are having their effect.

It is noticeable that the general lowering of prices of meat and foodstuffs is not followed by the price of fish. In my opinion the price is much too high to make it a popular article of diet. So long as a very large percentage of the catch of these

provinces finds an unlimited market, with high prices, in the United States, the price will keep its present level. In comparison with most other foodstuffs, fish is and has been the highest priced article of food in the market. With the reduced cost of production, now evident, I hope during the coming year to see fish take its proper place as a food and that its consumption will greatly increase. The efforts of the officers of this division to accomplish this will I am sure have a certain amount of effect.

I desire to record my appreciation of the officers of this division, as a whole, for their co-operation and support in the work of supervising the fisheries of these three provinces. I would also convey my thanks to that efficient body, the Royal Canadian Mounted Police, for the assistance given us, especially in the outlying portions of the country, where it is not possible for our officers to make numerous patrols, there, their assistance has been invaluable, and their whole-hearted co-operation with our officers has been pleasant to see.

In conclusion I may say that the year 1921, taking into consideration the very adverse market conditions obtaining throughout the first half of the year, may be considered a fairly successful one. It is apparent now that the limit of depression in the fishing industry is passed and that the future will be most successful.

## REPORT OF CHIEF INSPECTOR, MAJOR J. A. MOTHERWELL, WESTERN FISHERIES DIVISION (BRITISH COLUMBIA), FOR 1921.

The value of the fisheries products of the province of British Columbia exceeds that of any other province in the Dominion of Canada, in the fiscal year 1920-21 being 45 per cent of that of the whole Dominion.

### SALMON

First in value comes the salmon, the pack of which during the season just closed amounts to 602,657 cases of all varieties. The preceding season the total pack was 1,187,616 cases, or close to 100 per cent greater than the year 1921. Not since the year 1908 has the salmon pack in this province been so small. This is due principally to the practical failure of the sockeye run together with the fact that owing to the condition of the markets there was no incentive for the canners to pack springs, cohoes, pinks, or chums.

The sockeye pack for the whole province during 1921 was 163,914 cases against 351,405 cases for 1920 and 339,848 for the brood year of 1917, and in the big year of 1905, 1,080,673 cases. It will be plainly seen that the supply of this variety of salmon has become alarmingly depleted. This is particularly the case in the Fraser River district where the pack this year was only 35,900 cases and where, unless some co-operation can be obtained from the interests on Puget sound, the small supply which annually comes to this locality will undoubtedly be entirely wiped out.

In the northern district, the Naas river appears to be going the way of the Fraser and would appear to call for some very drastic action.

The sockeye pack on the Skeena has been the worst in the history of that stream and the experience during the past season at the Bella Coola, Rivers Inlet and Smiths Inlet districts has been also extremely disappointing.

The sockeye variety being by far the most valuable has in the past been fished much more intensively than others and there would appear to be no doubt that this is the chief cause for the present condition. In spite of the fact that the amount of fishing equipment has materially increased the catch has been becoming less.

It has been suggested that during the period of the war when the cry was for food, more food, and still more food, a much larger proportion of the salmon runs

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was taken than would have been the case under normal conditions and the industry is possibly now feeling the result of that intensive fishing in the brood years of the four-year cycles.

It has been intimated by a most eminent authority on the salmon on this coast that this year's small run may be due to a large extent to the conditions found on the feeding grounds between the time the fingerlings left the fresh water and the time they returned from the sea as mature fish. In the Skeena district the sockeye during the past season were of an unusually small average in size and this fact may confirm the above theory.

Another cause mentioned is the fact that four years ago, in 1917, there occurred a series of unusually violent freshets. These extended practically over the whole coast of British Columbia and particularly north of the Fraser river. These occurred, unfortunately, shortly after the sockeye salmon had finished spawning and resulted in the spawning beds being largely destroyed and huge quantities of eggs totally lost.

It is very probable that each of the above three reasons was a contributing factor to this year's conditions and the situation being as it is, extraordinary means are imperative to conserve and if possible restore the runs of the sockeye salmon to the several areas.

The runs in recent years show conclusively that in the past there has not been a sufficient escapement of parent fish of the sockeye variety to the spawning grounds. That being the case and if fishing operations were carried on with no greater intensity than up to several years ago, the necessity for some curtailment would still be apparent, but in the light of the last few years experience when larger quantities of gear were used and in spite of which the catch became smaller, the necessity for some drastic action is much more evident and there is no alternative but to provide immediately for a much larger escapement.

Undoubtedly the first consideration of the administration is the conservation of the supply as it can be readily realized that if the supply of raw product is not maintained it will only be a matter of time when the salmon fishing industry will be a thing of the past. The most efficacious way of assuring an adequate escapement of parent fish is by means of curtailing the fishing in the way of increased weekly closed periods, a shorter fishing season, the lowering of the fishing boundaries, or all three methods, at the same time increasing to the greatest extent possible fish cultural operations and efforts in the way of clearing from the salmon streams all obstructions to the ascent of the parent fish to the spawning beds.

To insure a sufficient escapement of salmon it may become necessary to so curtail fishing operations as to make them unprofitable to both fishermen and canners and other branches of the industry until the runs have been again built up. In this way the salmon supply would be preserved but it is possible that the industry, which is already in a precarious position financially owing to the last few years experience, may be irretrievably injured and the situation is so serious as to require the most careful consideration.

On the other hand if no prompt and adequate action is taken and if the runs are permitted to decrease each season it will be only a very short time before the runs of sockeye are so depleted as to result in the loss of employment to thousands of fishermen who now depend on the sockeye fishing and in addition the numerous canning establishments will be unable to operate for lack of a supply of this particular variety of salmon.

Under the present conditions there is only one course open and that is to preserve the supply and steps are being taken towards this end and will be applicable to operations in 1922.

During the season just ended greater restrictions were placed on the sockeye fishing than in previous years, the season being closed earlier than usual and at one point in particular the weekly closed season considerably extended.

Owing to the fact that the fall grades of salmon have not been in such demand as the sockeye there have not been fished to the same extent and do not show serious depletion apart from several points which will receive particular attention in the future from the standpoint of conservation. The supply of pinks and chums has been well maintained and although the packs of these varieties for the past year have not been large it was due to the anticipation that the market would not be in a condition to absorb any quantity.

The spawning areas of the fall varieties were well seeded this year although in certain localities fishermen were disappointed at not obtaining as large a catch as they expected. This was due to the streams being so high and there being so much fresh water that the fish instead of having to wait at the mouths of the streams for the water to rise, proceeded immediately up to the spawning beds and so escaped the nets. Fishing for pinks and chums is mostly carried on by means of seines although a considerable quantity of pinks is taken in the gill-nets during the sockeye season.

The supply of red salmon being apparently insufficient to fill the market requirements it is very probable that the demand for pinks and chums will be considerably increased and although there is no marked depletion in the supply of the varieties there is no doubt that in order to insure the runs against being overfished the proper steps will be taken next season to the end that the experience in connection with the sockeye supply will not be repeated in the case of the fall varieties.

A good run of spring salmon was experienced during the season 1921, in the northern district, the fish averaging about thirty pounds. The run of this variety to the Fraser River was satisfactory. The same may be said of the West Coast of Vancouver Island. It is regretted that probably eighty per cent of the catch of this variety in that district is exported. Sixty per cent of the fishermen trolling for salmon on the west coast during 1921 were Japanese who account for at least eighty per cent of the catch, practically all of which goes to Puget Sound points in a fresh or mild cured state.

*Export of Salmon.*—Under the present regulations fresh salmon, with the exception of the sockeye variety, are permitted to be exported free of export duty. The following are the quantities so shipped from the province during the past three seasons and mostly for processing in the United States:—

1919—25,557,000 pounds.

1920— 4,346,000 “

1921— 9,084,300 “

The majority of the above quantities was purchased by interests from Puget sound and conveyed to the canneries in those waters, canned and placed on the markets of the world under labels announcing that the contents were *British Columbia salmon packed on Puget sound*.

Unfortunately owing to the long distances the fish are carried when exported and the delay in the collecting boats obtaining loads, the salmon, when it reaches the cannery, is not always in a fit condition to be packed. In past years it has been canned, however, and the injury done the British Columbia industry by the processing of this inferior fish, some of which was found to be unfit for human consumption, will be appreciated.

It is anticipated that with the demand for the fall grades of salmon improving the Alaskan and Puget sound cannery interests, whose own supply of raw product has been depleted, will be coming more and more to Canadian waters at the expense of the British Columbia industry.

In this connection it is interesting to note that an export duty of two cents a pound would have resulted in a revenue to Canada amounting to \$779,746.

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## HALIBUT

Next in value to the salmon comes the halibut fishery. During the twelve months just ended the total landings in British Columbia ports amounted to 32,586,800 pounds. Of this amount 13,055,400 pounds were landed by Canadian bottoms and 19,531,400 pounds by American bottoms.

No licenses are required in the case of halibut fishermen owing to the fact that practically all operations are carried on in extra territorial waters. There is, therefore, no revenue from this source apart from the customs duties although the benefit derived from so many boats calling at Canadian ports where they are permitted to outfit, dispose of their catch and engage crews, will be readily appreciated.

As each season passes, the necessity for a closed period in connection with this fishery becomes more apparent. The numerous reasons have already been very thoroughly gone into by the Canadian American Fisheries Conference of 1918 and in the report submitted it is ably demonstrated that neglect to protect halibut during the winter months would have absolutely no justification and would result in the absolute ruin of this enormously valuable fishery.

It will be extremely regrettable if the American Senate refuses to ratify the proposed Halibut Treaty and it is sincerely hoped that the remarkable unanimity of all concerned, both Canadians and Americans, on the absolute necessity and desire for such protection, will result in the hoped for ratification.

## HERRING

The supply of herring on the British Columbia coast shows no depletion. The pack put up by the several different methods, varies from year to year naturally owing to market conditions. During the past season 2,417 barrels of herring were Scotch cured in the Barclay Sound district and for which a demand was found principally in the Eastern States; 4,149 cases were canned and 23,998 tons were dry salted for the Oriental market. Smaller quantities of this variety of fish were smoked and also placed on the local markets in a fresh state.

Apart from Nanaimo and Barclay sound, herring is not caught in large quantities except in the Prince Rupert area where large amounts are used fresh and frozen each year for the purposes of halibut bait. During recent years American boats proceeding north to the halibut grounds have been able to obtain supplies of bait at Barclay sound points and Nanaimo and it is expected that the quantities in the southern part of the province will be considerably increased in the future.

## PILCHARDS

During the calendar year 1920 there were 91,197 cases of pilchards packed and during the year 1921 only 16,091 cases. The decrease is due entirely to market conditions as this very desirable variety of food fish is very abundant on the west coast of Vancouver island.

Recently new markets have been developed in New Zealand, Australia and India and it is anticipated that in future years large quantities of pilchards will be packed and shipped to those points.

## SUNDRY VARIETIES

In addition to the varieties specially mentioned there is a great number of other edible fish which are taken to a more limited extent. Included in these are the cod, flounder, sole, skate, smelt, octopus, clams, crabs, shrimps, sturgeon, perch, abalone and oysters, the great proportion of which are used fresh and which in the aggregate represent a very considerable value annually.

## WHALING

Due to market conditions for the products of these mammals, no whaling operations have been carried on in British Columbia during the season 1921, the stations at Naden Harbour, Rose Harbour and Kyuquot being closed. Prospects look considerably better, however, for next season and it is anticipated that hunting will be resumed in 1922.

## FUR SEALS

There were 2,349 fur seals taken off the coast of British Columbia under Article 4 of the Pelagic Sealing Treaty of 1911, which permits Indians to hunt these animals by means of canoes propelled entirely by oars, paddles or sails and without the use of firearms, and preparations are under way to hunt fur seals during next season on a larger scale. These operations require careful supervision by the boats of the Fisheries Protection and Fisheries Patrol Service in order to insure that the provisions of the treaty are not violated.

## REDUCTION WORKS PLANTS

During the past season seven plants were operated for the purpose of the manufacture of fish meal, fertilizer, and the rendering of oil from the non-edible fishes, sharks, hair seals, and the offal from the numerous canneries. During the period of the war there was considerable activity in this industry owing to the abnormally high prices of fish oil. During the past few seasons, however, the prices have been so low that the profits have been reduced practically to the vanishing point.

This class of industry is deserving of every encouragement, particularly as grayfish are used in very large quantities, resulting in the destruction of a fish which is so injurious to the runs of the edible varieties. In addition the offal from the canneries and cold storage plants is collected and processed, thereby obviating the necessity for the dumping of this raw product in most undesirable places and eliminating the expense of towing it long distances to deep water.

From the shark skins, excellent leather has been manufactured and it is regretted that the operations of the one plant in the British Columbia waters which used sharks, found it impossible to continue. The supply of the raw product is abundant and no doubt this branch of the industry will be properly developed in the course of a few years.

## HAIR SEALS AND SEA LIONS

During the past season the demands for some action by the department with a view to eliminating hair seals and sea lions from the salmon fishing grounds has become more insistent. There is no doubt that vast quantities of very valuable salmon are destroyed, resulting, in certain localities, in the difference between profit and loss to the fishermen. It is hoped that some means may be shortly devised whereby these pests can be exterminated or at least so reduced in numbers as to bring relief to the salmon fishing industry. The seals are difficult to destroy, in any appreciable numbers, but the sea lions are a fairly easy prey when hunted on their rookeries.

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## LICENSES

The following statement shows the number of licenses issued during the year 1921 in the Province of British Columbia:—

	1921	Increase over 1920	Decrease
<b>Salmon gill-net—</b>			
Whites and Indians.....	2,681	151	.....
Other nationalities.....	2,096	132	.....
	<u>4,777</u>	<u>19</u>	<u>.....</u>
<b>Salmon trolling—</b>			
Whites and Indians.....	957	278	.....
Other nationalities.....	505	8	.....
	<u>1,462</u>	<u>.....</u>	<u>586</u>
<b>Salmon cannery.....</b>	<b>56</b>	<b>.....</b>	<b>10</b>
<b>Salmon trap-net.....</b>	<b>8</b>	<b>.....</b>	<b>11</b>
<b>Salmon purse-seine.....</b>	<b>59</b>	<b>.....</b>	<b>103</b>
<b>Salmon drag-seine.....</b>	<b>34</b>	<b>.....</b>	<b>11</b>
<b>Salmon saltery—</b>			
Whites and Indians.....	26	23	.....
Other nationalities.....	9	.....	.....
	<u>35</u>	<u>23</u>	<u>.....</u>
<b>Herring gill-net—</b>			
Whites and Indians.....	36	.....	2
Other nationalities.....	21	11	.....
	<u>57</u>	<u>9</u>	<u>.....</u>
<b>Herring purse-seine.....</b>	<b>25</b>	<b>.....</b>	<b>10</b>
<b>Cod gill-nets—</b>			
Whites and Indians.....	31	.....	3
Other nationalities.....	80	.....	.....
	<u>111</u>	<u>.....</u>	<u>3</u>
<b>Other varieties—</b>			
Whites and Indians.....	567	43	.....
Other nationalities.....	386	72	.....
	<u>953</u>	<u>115</u>	<u>.....</u>

## PATROL SERVICE

The British Columbia coastal waters during the past season were patrolled by two steam and eighteen gasoline boats the property of this branch of the department. In addition thirty gasoline boats were chartered during the fishing season, making a total of fifty. It will be appreciated that with a coast line of approximately 7 000 miles containing hundreds of inlets, bays and streams where fishing is carried on, it is imperative that an efficient patrol service be maintained to the end that the valuable fisheries resources of the province may be preserved. A great majority of the hundreds of streams entering into the sea are frequented by some variety of salmon, and if great care is not taken to cover all territory it would be a very simple matter for the runs of salmon, particularly the fall varieties, to be exterminated. While it is not possible to cover all streams as adequately as could be desired, at the same time, consistent with reasonable economy, the patrol service has proved to date fairly satisfactory. If intensive fishing for fall varieties of salmon develops there is no doubt that the patrol must be considerably increased if the salmon supply is to be saved.

It is interesting to mention the fact that during the past season a certain amount of patrolling was done by means of one of the government sea planes maintained at the Jericho Flying Station in Vancouver. During the season the officers of this department used this method to the extent of forty-eight hours' actual flying time and were able to cover long distances with a saving of much valuable time and with the result that considerably greater efficiency was effected in those parts where this method was adopted. It was hoped that the flying service could be utilized to a very large extent and possibly be substituted for several of the gasoline boats. However, owing to the fact that the air craft cannot be used at night in the fisheries service and also to the fact that weather conditions, fog particularly, often prevent flying, it was not found possible to make as much use of the service as was anticipated. In addition to this the expense in connection therewith, unless it will result in some great saving of time, is hardly commensurate with the benefits obtainable.

As an example of the saving in time it is interesting to refer to a trip which was made from Vancouver to Anderson and Kennedy lakes on the west coast of Vancouver island. Owing to the transportation facilities to these more or less inaccessible points, the journey by ordinary means would have consumed probably seven days. By means of the sea plane the officers were able to leave Vancouver at eight o'clock in the morning, spend three hours at each of the hatcheries situated on the above-mentioned lakes, and return to Vancouver by six o'clock the same evening.

Mention should be made of the increased efficiency and economy to the Patrol Service resulting from the appointment of a highly qualified gasoline engineer who takes charge of all the repair work of these launches at the end of the season and keeps them in running order during the period they are in commission. The expense to the department in the way of his salary is saved many times over each season.

#### EBERTS' REPORT

It is with considerable gratification that the report of the commissioner, the Hon. Mr. Justice D. M. Eberts, has been received after his investigation into the several charges against the administrative officers of the British Columbia branch of the Fisheries Service. It is exceptionally gratifying to find that all the charges made have been proved to be absolutely without foundation and on the contrary the commissioner in his report specially testifies as to the efficiency of the officials of the Department of Fisheries in British Columbia and particularly to those who were charged with irregularities, dereliction of duty and partiality. Judge Eberts states with the greatest of emphasis that not the slightest evidence was adduced to convince him that any one of these gentlemen was guilty of any of the charges made. On the contrary, he was impressed on all occasions with their sincere desire to carry out the fishery laws in keeping with their instructions, with their grasp of the fishery situation, in their desire to be fair, and their never-failing object to preserve the fishing industry in British Columbia for all time.

#### INDIANS

Each season, with the increased amount of information received, it becomes more and more apparent that the depredations of the Indians on the spawning beds of the salmon has become so serious as to greatly endanger the supply of this variety of fish. In the Fraser River watershed, Indians or others are not permitted to take salmon above the Mission bridge and as far as it is possible this regulation is enforced. On the Skeena River watershed, however, the Indians are permitted to, for the purpose of their own winter's food, take from the spawning grounds what salmon are required. During the past fall many thousands of spawning sockeye salmon were destroyed which will result in a loss to the fishing industry impossible to estimate.

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In addition to the Babine Lake district Indians, during the season 1921, a large number of families from the Fraser River watershed came across to the Skeena and obtained their food supply and these Indians are making arrangements whereby a greatly increased number of families will repeat this operation next year.

In view of the immense value and importance of the sockeye salmon fishery and the present depleted condition of the runs, it is imperative that this practice be stopped at the earliest possible moment, otherwise all efforts at conservation will be of no avail. It is not reasonable to seriously hamper the fishing industry of the province by way of increased restrictions in fishing operations and permit the Indians to nullify all good results obtained thereby.

## MEETINGS WITH INSPECTORS AND OVERSEERS

In the spring of 1921 the inspectors and overseers of the province were called to Vancouver for the first of what is intended to be the annual meeting of such officers with the chief inspector for the purpose of discussing fully the numerous fisheries problems of the several districts and for an exchange of ideas and advice which it is hoped will result in much greater efficiency in the service. There is no doubt that personal contact with the officers of the province results in a far better understanding of one another's problems and makes for a considerably increased esprit de corps and the betterment of the service generally.

CONFERENCE WITH STATE OF WASHINGTON FISHERIES BOARD RE: SALMON FISHERIES OF THE

## FRASER RIVER AND PUGET SOUND

As long as twenty years ago it was apparent that the sockeye runs to the Fraser river would require increased conservation methods in order to preserve this enormously valuable natural resource. Owing to the fact, however, that the salmon ascending the Fraser river pass through the waters of Puget sound on the American side of the line, it was not possible to put into force any regulations which would curtail fishing operations on the Canadian side if similar steps were not taken in connection with the fishing on the American side of the line.

Commissions have been appointed and many meetings have been held for the purpose of arranging for some co-operation with the authorities to the south with a view to proper conservation methods being provided. Unfortunately up to date it has been impossible to obtain such co-operation and the result has been that the sockeye fishery of the Fraser has become so seriously depleted that the large packs taken in past years and which should be worth annually in the vicinity of thirty millions of dollars, have been reduced to a very small fraction of that amount.

It was hoped that the draft treaty recommended by the Canadian-American Commission of 1918 would have provided machinery which would permit of the proper handling of the situation. Unfortunately, although the treaty was signed by both the Canadian and American members of the commission and was tentatively approved by the Dominion Government, it was finally withdrawn from the American Senate, due to strenuous opposition from the State of Washington. This final action by the Senate was advised to this department during the present fall.

As soon as it became apparent that no help could be looked for in the way of the proposed treaty, steps were immediately taken to meet the newly appointed State of Washington Fisheries Board, in the hope that it would have sufficiently wide powers to co-operate with the Dominion Government and make possible an agreement whereby the salmon runs to the Fraser river could be restored and adequate conservation methods enforced.

A meeting was held in Vancouver on December 12 last. No agreement was reached as to the means of restoring the sockeye runs to the Fraser river, but an understanding was arrived at with respect to several other questions which came up at the conference.

OBSTRUCTIONS IN STREAMS, 1921

As a more intimate knowledge of the conditions obtaining on the spawning beds and in streams leading to spawning areas for salmon becomes available, the necessity for considerable attention being given each year to the clearing out of obstructions to the ascent of spawning fish becomes more apparent.

It will be appreciated that in the work of clearing obstructions in streams there are many difficulties with which the engineers have to contend. In the first place, experienced men are required and it is often difficult to obtain these for the short periods during which it is possible to operate.

Owing to many of these obstructions being in very remote parts of the province, the lack of facilities for transporting men and supplies causes much loss of time and makes the work very hazardous. In many instances supplies have to be packed in on the backs of the men, as it is impossible to use horses or boats.

Another difficulty to be confronted is the fact that in most cases there are only certain months in the year when the weather and water conditions permit of obstructions being removed satisfactorily, and as these periods are very similar in most parts of the coast, the attention of the engineering staff is required at many localities at much the same time, rendering the very desirable personal attention very difficult and at times impossible.

The clearing of obstructions, survey of hatchery sites, building of fishways, wharves, preparing of plans and other related work has necessitated during the past season the employment of additional help in the engineer's office, and it is anticipated that as this most important work increases it will be necessary to provide permanent assistance in the way of an assistant who can attend to the drafting and office routine, both engineers being kept very busy attending personally to the outside work.

REVENUE

In comparing the total revenue of the province for the calendar year 1921 with that of 1920 it will be observed that the past season shows a reduction of approximately \$82,000. The following comparative statement covering the principal items on which revenue is collected is very eloquent:—

	1920	1921
Salmon gill-net.. . . . .	\$ 47,650 00	\$ 47,790 00
Salmon drag-seine.. . . . .	8,850 00	4,650 00
Salmon purse-seine.. . . . .	46,800 00	18,600 00
Salmon cannery.. . . . .	32,500 00	21,500 00
Salmon trap-net.. . . . .	9,500 00	4,000 00
Salmon saltery.. . . . .	600 00	1,700 00
Salmon trolling.. . . . .	9,260 00	7,315 00
Tax on seine and trap-net caught salmon.. . . . .	31,474 74	17,988 16
Tax on canned salmon.. . . . .	39,415 50	24,097 78
Herring purse-seine.. . . . .	2,775 00	1,875 00
Crab.. . . . .	445 00	485 00
Fines.. . . . .	2,203 50	1,708 50
Sales.. . . . .	3,296 47	1,186 03
Sundry licenses.. . . . .	1,307 50	1,384 50
Totals.. . . . .	\$236,077 71	\$154,279 97

It will be observed that practically all the reduction is due to the operations in connection with salmon fishing. Owing to the unfortunate condition of the salmon market as affecting pinks, chums, coho, and spring salmon and also to the fact that a great percentage of the first two varieties particularly are taken by means of seines, it was not anticipated that the revenue would be so great as that of last year. In fact at the first of the season it was anticipated that practically no pinks or chums would be canned apart from those which were taken by gill-nets while fishing for the sockeye variety. As the fishing season advanced, however, it

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was found that the market conditions were improving considerably. In addition most companies had on hand a stock of cans or tin plate which had been purchased at top prices and which they were desirous of salvaging as far as possible as prices of this supply were falling. This being the case, during the latter part of the season the fall varieties were fished to a greater extent than at first expected.

## CO-OPERATION BY PROVINCIAL FISHERIES DEPARTMENT

It is with much pleasure that reference is made to the apparent desire of the Provincial Fisheries Department to co-operate with this one as far as possible for the benefit of the fishing industry of the province. Evidence of this spirit has been abundant during the past year and I particularly wish to testify to the assistance rendered by Mr. J. P. Babcock, the assistant to the commissioner at Victoria and who has at all times shown a willingness to assist by means of his personal, extensive, and valuable knowledge and experience of British Columbia conditions.

## STAFF

In conclusion, I wish to express personal appreciation of the loyalty and efficiency of the staff of the British Columbia Fisheries Service. This is particularly gratifying during the first year of the writer's experience as chief administrative officer for the province.

## INSPECTION OF SPAWNING AREAS

During the season 1921 the inspection of spawning areas was given particular attention and it is proposed to have this work performed with the greatest possible thoroughness each season.

The several fishery officers of the province are being specially coached with a view to obtaining the most reliable information possible and the results of the first season have been most satisfactory. The report in full which follows was prepared from data furnished by the inspectors, overseers, guardians and superintendents of hatcheries together with a certain amount obtained by the chief inspector of the province personally, who together with Mr. J. P. Babcock, the assistant to the Commissioner of Fisheries for the province of British Columbia, and Dr. C. H. Gilbert, of the University of Stanford, visited particular portions of the Fraser river watershed.

## APPENDIX II.

## FINANCIAL STATEMENT, FISHERIES, 1921-22

Vote No.	Services	Appropriation	Expenditure
237	Salaries and disbursements of fishery officers, Fisheries Patrol Service, Oyster Culture.....	\$ 754,000 00	\$ 708,438 72
238	Building fishways, etc.....	40,000 00	22,681 00
239	Legal and incidental expenses.....	4,000 00	1,581 82
240	Conservation and development of deep sea fisheries.....	25,000 000	18,128 79
241	Fisheries intelligence Bureau.....	5,000 00	1,819 84
242	Inspection of canned and pickled fish.....	15,000 00	14,999 69
243	Fish culture.....	365,000 00	362,636 93
244	Scientific investigations into fisheries.....	15,000 00	11,399 11
245	International Commission—Fraser River.....	10,000 00	
246	Marine Biological Board.....	42,000 00	42,000 00
		1,275,000 00	1,183,685 90
	Civil Government salaries.....	92,060 00	83,152 69
	Contingencies.....	25,000 00	23,923 91
	Fishing bounty.....	160,000 00	159,449 80
		1,552,060 00	1,450,212 30
367	Cost of living bonus.....		78,676 48
529	Reclassification arrears.....		4,774 66
	Superannuation Act, 1920, No. 4.....		4,756 66
	Gratuities re deceased officials.....		230 00
	Total net expenditure, 1921-22.....		1,538,650 10

## REVENUE COLLECTED, 1921-22

Class	Licenses	Revenue Tax	Fines	Sales	Total collected	Amounts refunded	Net Revenue
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Licenses, etc.—							
Nova Scotia.....	10,758 44		1,646 01	455 94	12,860 39	20 00	12,840 39
Prince Edward Isld..	2,489 47		325 00	62 75	2,877 22	2 00	2,875 22
New Brunswick.....	13,781 80		1,539 00	748 65	16,069 45	30 00	16,039 45
Quebec.....	13,972 93		250 00	134 46	14,357 39		14,357 39
Ontario.....			30 00	851 30	881 30		881 30
Manitoba.....	8,451 50		541 00	297 31	9,289 81		9,289 81
Alberta.....	9,899 00		142 00	78 30	10,119 30		10,119 30
Saskatchewan.....	2,633 00		256 00	585 31	3,474 31		3,474 31
British Columbia....	120,313 96	29,869 07	1,643 50	2,677 80	154,504 33	600 00	153,904 33
Yukon .....	375 00				375 00		375 00
Totals.....	182,675 10	29,869 07	6,372 51	5,891 82	224,808 50	652 00	224,156 50
Casual.....							5,451 20
Fish culture.....							6,066 05
Revenue under Pelagic Sealing Treaty.....							86,080 62
Premiums on exchange							7,146 37
Total net revenue collected, 1921-22.....							328,900 74

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DETAILED STATEMENT OF SALARIES AND DISBURSEMENTS OF FISHERY OFFICERS  
EXPENDITURE FOR FISCAL YEAR 1921-22

Districts	Officers				Guardians				Miscellaneous	—	Totals	
	Salaries		Disbursements		Wages		Expenses					
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
<i>Eastern Division—</i>												
Halifax office.....	12,899 00		1,340 91						856 04		15,095 95	
Nova Scotia No. 1.....	11,250 48		6,591 15		12,910 50	48 37			227 91		31,028 41	
" No. 2.....	14,557 90		8,899 31		3,870 92	309 90			235 38		25,873 41	
" No. 3.....	16,333 06		8,386 62		4,484 91				154 01		29,358 60	
New Brunswick No. 1.....	8,219 00		4,684 33		3,893 00	179 26			229 90		17,205 49	
" No. 2.....	14,962 90		7,629 66		9,065 48				193 79		31,851 83	
" No. 3.....	5,794 09		2,271 41		6,939 60				93 27		15,098 37	
Prince Edward Island.....	7,434 99		3,320 64		605 00	24 13			139 08			
Totals.....	91,451 42		41,124 03		41,769 41	561 66			2,129 38		177,035 90	
Quebec.....	11,465 79		6,574 32		1,134 05	329 31			9 01		19,902 48	
<i>Central Division—</i>												
Winnipeg office.....	3,180 00		1,021 34						43 25		4,244 57	
Manitoba.....	6,285 62		3,067 49		215 16	229 20			61 20		9,858 69	
Saskatchewan.....	10,437 66		4,235 87		215 00	407 30			34 70		15,330 53	
Alberta.....	7,695 83		4,366 14		122 50	262 75			26 70		12,473 92	
Totals.....	27,599 11		12,690 84		552 66	899 25			165 85		41,907 71	
<i>British Columbia Division—</i>												
Vancouver office.....	16,617 90		1,550 80						3,250 10		21,418 80	
British Columbia No. 1.....	11,342 67		6,593 45		2,558 03	877 95			554 51		21,926 61	
" No. 2.....	12,247 83		2,958 93		2,049 52	522 90			684 76		18,464 04	
" No. 3.....	14,340 00		4,736 25		7,432 59	1,657 41			103 55		28,269 80	
Totals.....	54,548 50		15,839 43		12,040 14	3,058 26			4,592 92		90,079 25	
General Account.....	385 00								25,084 27		25,469 27	
SUMMARY												
Eastern Division.....	91,451 42		41,124 03		41,769 41	561 66			2,129 38		177,035 90	
Quebec.....	11,465 79		6,574 32		1,134 05	329 31			9 01		19,902 48	
Central Division.....	27,599 11		12,690 84		552 66	899 25			165 85		41,907 71	
British Columbia Division.....	54,548 50		15,839 43		12,040 14	3,058 26			4,592 92		90,079 25	
General Account.....	385 00								25,084 27		25,469 27	
Totals.....	185,449 82		76,228 62		55,496 26	4,848 48			32,371 43		354,394 61	



Departmental Boats—											
Anina.....	291 24	25 90	7 76	11 00	34 00	309 89					
Black Raven.....	1,212 94	347 03	57 73	77 06	53 37	2,733 71					
Bonila.....	1,414 41	124 00	43 78	229 63	85 95	4,418 60					
Babine No. 1.....			9 75	6 05	5 00	13 95					
Babine No. 2.....			35 50		6 00	951 64					
Cohoe.....	570 40	18 10	114 57	31 07	105 30	1,901 81					
Egret.....	245 26	128 85	92 98	97 16	4 52	1,677 43					
Elk.....		119 80	57 07	10 02	3 61	3,867 52					
Fispa.....	1,417 22	6,922 64	2,277 50	1,041 41	131 04	980 94					
Foam.....	4,279 36	401 08	130 67	80 29	22 14	19,840 99					
Givenchely.....	27,663 21	6,634 86	2,332 99	1,848 53	3,358 25	5,950 92					
Gull.....	1,409 24	8,371 64	25 70	80 97	95 32	100,808 02					
Hawk.....	1,610 00	462 09	12 65	86 43	12 42	2,574 27					
Heron.....	1,830 43	598 35	19 75	125 08	76 19	2,334 89					
Humming Bird.....		3 00	56 01	4 50		2,804 39					
Kayak.....	590 33	249 86	28 96	126 14	16 97	1,576 74					
Linnet.....	1,264 39	513 60	6 00	48 15	30 59	1,972 98					
Marfish.....	5,167 19	2,232 20	5,047 15	747 74	279 17	18,144 31					
Merlin.....	1,194 51	261 64	16 02	77 53	29 45	36 16					
Merry Sea.....	4,650 00	1,434 65	249 13	144 79	25 51	1,616 81					
Ptarmigan.....	27 50	38 34	249 01	33 61	10 81	6,779 55					
Swan.....	5,040 00	130 81	89 26	40 76	63 43	775 57					
Semi-hmo.....	1,880 32	300 08	92 66	6 37	11 80	5,389 63					
Chartered Boats—					10 69	2,299 23					
Akashi.....	933 16	481 72	42 00		959 00	2,415 88					
Charlotte.....	805 00	52 86	10 70		201 30	1,129 86					
Dustie.....	480 00	187 15	29 79	11 60	610 00	1,318 54					
Ethelda.....	947 53	395 77	74 96	12 88	1,799 25	3,230 39					
Frisbie.....	480 00	186 76	29 79	11 61	610 00	1,318 16					
Grayling.....		5 34	2 55		40 00	47 89					
Kla Quack.....					60 00	60 00					
Lamaus.....	690 00	209 32	33 95	11 40	460 00	1,404 67					
Nellie B.....	986 67	101 35	9 12		760 00	1,867 14					
Nora.....	785 99	530 61	118 54	9 01	1,171 00	2,615 15					
Nortonian.....	178 77	36 11	12 76		105 00	330 64					
Owl.....	304 00				312 00	616 00					
Oyashimo.....		91 88	20 33		418 50	530 71					
M.....	1,155 00	143 09	14 23	16 49	340 00	1,668 81					
Regal.....		301 03	41 35	11 67	345 00	699 06					
Sophann.....	920 00	200 04	57 16	7 64	1,220 00	2,404 84					
Starston.....	582 66	451 92	117 04	6 85	1,173 50	2,331 97					
Saginaw.....	920 00	130 05	76 98	2 37	1,220 00	2,349 40					
Takooch.....	912 47	182 11	11 00		839 00	1,914 58					
Wolverine.....	627 10	156 04	17 29		755 00	1,555 43					
Totals.....	90,957 39	33,192 25	17,375 39	11,190 28	5,922 27	54,797 01					
General Account.....						126 62					
						189,842 93					
						231,740 35					
						126 62					

General Account.....

\* Salvage in Miscellaneous, \$31,410.80.

EXPENDITURE FOR FISCAL YEAR 1921-22—Continued  
SUMMARY

Vessels	Pay list	Board or Pro- visions	Fuel	Repairs		Supplies		Clothing	Miscel- laneous	Totals
	\$ cts.	\$ cts.	\$ cts.	Hull	Engine	Engine	Deck			
Eastern Division.....	30,721 85	38 22	7,990 87	1,053 39	1,310 60	2,318 90	1,579 98	740 92	2,240 07	47,994 80
Quebec.....	15,589 86	6,075 72	13,393 23	4,496 30	2,896 32	1,702 74	1,420 46	963 32	3,409 27	49,947 22
Central Division.....	10,606 22	2,552 73	7,016 98	941 10	396 85	528 99	1,599 79	617 09	364 77	23,624 52
British Columbia Division.....	90,957 39	9,740 59	33,192 25	17,375 39	11,190 28	5,922 27	6,090 93	2,474 24	54,797 01	231,740 35
General Account.....									126 62	126 62
Totals.....	147,875 32	18,407 26	61,593 33	23,866 18	15,794 05	10,472 90	9,691 16	4,795 57	60,937 74	353,433 51

SESSIONAL PAPER No. 29

## DETAILED STATEMENT OF FISH CULTURE

EXPENDITURE, FISCAL YEAR 1921-22

Hatcheries	Salaries	Labour	Maintenance	Totals of Hatcheries	Totals of Provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Nova Scotia—</i>					
Pedford.....	1,000 00	105 00	1,928 75	3,033 75	
Isaac's Harbour.....		32 50		32 50	
Lindloff.....		68 92	610 70	679 62	
Margaree hatchery.....	3,405 00	521 30	2,351 80	6,278 10	
Margaree Pond.....		1,168 89	2,254 50	3,423 39	
Middleton.....	2,032 90	667 51	2,177 31	4,877 72	
Windsor.....	1,260 00	509 60	1,152 42	2,922 02	
Totals.....	7,697 90	3,073 72	10,475 48	21,247 10	21,247 10
<i>Prince Edward Island—</i>					
Kelly's Pond Hatchery.....	1,968 39	185 00	2,151 19	4,304 58	4,304 58
<i>New Brunswick—</i>					
Buctouche.....		10 00		10 00	
Grand Falls.....	2,130 00	662 80	2,773 68	5,566 48	
Miramichi Hatchery.....	2,820 00	157 50	1,283 88	4,261 38	
Miramichi Pond.....		1,559 75	2,491 93	4,051 68	
Nepisiguit.....		356 37	46 49	403 36	
New Mills Pond.....		1,863 77	4,008 93	5,872 70	
Restigouche.....	2,820 00	679 49	2,351 40	5,850 89	
Sparkle.....		380 59	159 90	540 49	
St. John Hatchery.....	1,581 45	2,257 04	3,779 20	7,617 69	
" Pond.....		2,422 50	7,880 61	10,303 11	
" Shad.....		26 00		26 00	
Tobique.....		199 02	268 82	467 84	
Totals.....	9,351 45	10,575 33	25,044 84	44,971 62	44,971 62
<i>Quebec—</i>					
Gaspé.....	2,700 00	3,076 73	3,301 65	9,078 38	
Tadoussac.....	1,500 00	4,319 63	3,854 18	9,673 81	
York Pond.....			20 00	20 00	
Totals.....	4,200 00	7,396 36	7,175 83	18,772 19	18,772 19
<i>Ontario—</i>					
Collingwood.....	3,645 00	2,190 57	7,001 89	12,837 46	
Kenora.....	2,993 57	4,480 25	4,560 08	12,033 90	
Kingsville.....	3,795 00	1,521 50	4,464 93	9,781 43	
Port Arthur.....	2,760 00	1,463 50	1,704 10	5,927 60	
Sarnia.....	3,558 75	2,367 50	5,302 03	11,228 28	
Southampton.....	2,247 58	1,287 49	2,467 60	6,002 67	
Thurlow.....	5,085 00	3,630 12	6,328 19	15,043 31	
Warton.....	3,960 00	1,370 35	2,218 37	7,548 72	
Totals.....	28,044 90	18,311 28	34,047 19	80,403 37	80,403 37
<i>Manitoba—</i>					
Dauphin River.....	1,810 16	4,801 23	3,212 01	9,823 40	
Dauphin River spawn camp.....		1,600 75	730 05	2,330 80	
Gull Harbour Hatchery.....	2,760 00	2,591 16	2,200 24	7,551 40	
Winnipegosis.....	1,889 76	6,509 39	5,745 94	14,145 09	
Totals.....	6,459 92	15,502 53	11,888 24	33,850 69	33,850 69
<i>Alberta—</i>					
Banff.....	3,375 00	909 75	3,890 33	8,175 08	
Spray Lakes.....		1,347 50	433 75	1,781 25	
Totals.....	3,375 00	2,257 25	4,324 08	9,956 33	9,956 33
<i>Saskatchewan—</i>					
Qu'Appelle.....	1,330 00	2,446 51	2,380 49	6,157 00	6,157 00

EXPENDITURE, FISCAL YEAR 1921-22—*Continued*

Hatcheries	Salaries	Labour	Maintenance	Totals of Hatcheries	Totals of Provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>British Columbia—</i>					
General account.....	6,310 00	172 17	11,148 02	17,630 19	
Anderson Lake.....	1,560 00	2,556 38	3,771 35	7,887 73	
Babine.....	1,430 00	2,964 48	5,373 15	9,767 63	
Cowichan.....	1,560 00	2,934 40	2,261 89	6,756 29	
Cultus.....	709 33	1,818 10	2,121 42	4,648 85	
Gerrard.....	375 00	1,555 79	1,497 90	3,428 78	
Harrison.....	1,680 00	4,307 05	8,708 42	14,695 47	
Kennedy.....	1,442 67	2,170 15	3,757 87	7,370 69	
New Westminster.....	662 90	1,156 84	1,956 33	3,776 07	
Pemberton.....	1,680 00	727 33	11,249 45	13,656 78	
Pitt.....	1,000 00	1,703 04	1,781 85	4,484 89	
Rivers Inlet.....	1,320 00	5,962 45	8,081 99	15,364 44	
Skeena River.....	1,946 45	6,252 74	8,642 36	16,841 55	
Stuart Lake.....	1,440 00	2,931 77	3,947 58	8,319 35	
Totals.....	23,116 35	37,212 69	74,299 67	134,628 71	134,628 71
General Account.....	4,020 00	50 00	4,275 34	8,345 34	8,345 34

## SUMMARY

Nova Scotia.....	7,697 90	3,073 72	10,475 48	21,247 10	21,247 10
Prince Edward Island.....	1,968 39	185 00	2,151 19	4,304 58	4,304 58
New Brunswick.....	9,351 45	10,575 33	25,044 84	44,971 62	44,971 62
Quebec.....	4,200 00	7,396 36	7,175 83	18,772 19	18,772 19
Ontario.....	28,044 90	18,311 28	34,047 19	80,403 37	80,403 37
Manitoba.....	6,459 92	15,502 53	11,888 24	33,850 69	33,850 69
Alberta.....	3,375 00	2,257 25	4,324 08	9,956 33	9,956 33
Saskatchewan.....	1,330 00	2,446 51	2,380 49	6,157 00	6,157 00
British Columbia.....	23,116 35	37,212 69	74,299 67	134,628 71	134,628 71
General Account.....	4,020 00	50 00	4,275 34	8,345 34	8,345 34
Totals.....	89,563 91	97,010 67	176,062 35	362,636 93	362,636 93



## APPENDIX No. III.

The following is a statement of the different kinds of licenses issued by the different Inspectors during the 1921-22 season:—

## QUEBEC—J. E. BERNIER, Inspector

Kind of License—	Number issued.
Lobster packing.....	75 (5 cancelled)
Lobster extensions.....	18
Lobster fishermen's.....	614 (2 cancelled)
Herring trap-net.....	29
Cod trap-net.....	264 (4 cancelled)
Salmon fishery.....	Nil.
Quebec fishery licenses.....	1,173 (41 cancelled and 11 free)
Receipt books.....	278
	<hr/> 2,155 (52 cancelled and 11 free)

## PRINCE EDWARD ISLAND—S. T. GALLANT, Inspector

Lobster packing.....	166 (2 cancelled)
Lobster extensions.....	83
Fish cannery.....	6
Quahaug fishery.....	1
Lobster fishermen's.....	1,448
Smelt gill-net.....	226
Smelt bag-net.....	220 (1 cancelled)
Oyster fishery.....	348
Scallop fishery licenses.....	1
Prince Edward Island trap-net.....	2
	<hr/> 2,418 (3 cancelled)

## NOVA SCOTIA, DISTRICT No. 1—A. G. McLEOD, Inspector

Lobster packing.....	51
Lobster extensions.....	25
Fish cannery.....	3
Nova Scotia angling permits.....	11
Lobster fishermen's.....	1,944
Smelt gill-net.....	155
Smelt bag-net.....	29
Oyster fishery.....	89
Nova Scotia trap-net.....	38
	<hr/> 2,320

## NOVA SCOTIA, DISTRICT No. 2—D. H. SUTHERLAND, Inspector

Lobster packing.....	63
Lobster extensions.....	42
Fish cannery.....	6
Scallop fishery.....	1
Nova Scotia drag-seine.....	169
Nova Scotia salmon net.....	20
Nova Scotia angling permits.....	20
Lobster fishermen's.....	2,802 (1 cancelled) no refund
Smelt gill-net.....	143
Smelt bag-net.....	201
Oyster fishery.....	136
Nova Scotia trap-net.....	117
Lobster pound licenses.....	1
Nova Scotia herring weir.....	20
Lobster pound certificates.....	181
	<hr/> 3,699 (1 cancelled)

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## NOVA SCOTIA, DISTRICT No. 3—H. H. MARSHALL, Inspector

Kind of License—	Number issued
Lobster packing.....	40 (1 cancelled)
Lobster extensions.....	52
Fish cannery.....	7
Nova Scotia angling permits.....	326 (4 cancelled)
Lobster fishermen's.....	4,342
Smelt gill-net.....	107
Smelt bag-net.....	23 (1 cancelled)
Lobster pound licenses.....	9 (1 cancelled)
Lobster pound certificates.....	676 (1 cancelled)
Nova Scotia trap-net licenses.....	156 (2 cancelled)
Scallop fishery licenses.....	201
Nova Scotia herring weir licenses.....	75
Receipt books.....	Nil
	<hr/> 5,286 (9 cancelled)

## NEW BRUNSWICK, DISTRICT No. 1—J. F. CALDER, Inspector

Lobster fishermen's.....	531
Fish cannery.....	8
New Brunswick salmon fishery.....	17
Smelt bag-net.....	Nil
Scallop fishery.....	5
New Brunswick special permits to dig soft-shell or long-neck clams.....	69
Lease of Dark Harbour, Grand Manan, N.B.....	1
New Brunswick Herring weir.....	530
Lobster pound licenses.....	7
Lobster pound certificates.....	420
	<hr/> 1,167

## NEW BRUNSWICK, DISTRICT No. 2—R. CROCKER, Inspector

Lobster packing.....	174
Lobster extensions.....	51
Fish cannery.....	2
Quahaug fishery.....	109
Lobster fishermen's.....	1,513
New Brunswick salmon fishery.....	395
New Brunswick bass gill-net.....	38
Smelt gill-net.....	189
Smelt bag-net.....	2,799 (33 free)
Oyster fishery.....	660
New Brunswick Bass fishery licenses.....	139
New Brunswick Herring Weir fishery.....	1
Lobster pound licenses.....	2
Lobster pound certificates.....	135
Special oyster permits.....	90
	<hr/> 6,111 (33 free)

## NEW BRUNSWICK, DISTRICT No. 3—H. E. HARRISON, Inspector

New Brunswick sturgeon fishery.....	4
New Brunswick whitefish fishery.....	20 (2 cancelled)
New Brunswick Salmon net permits.....	83
New Brunswick salmon fishery.....	107 (2 cancelled) no refund
Smelt gill-net.....	2
Smelt bag-net.....	Nil
New Brunswick Bass fishery.....	25
	<hr/> 241 (2 cancelled)

## MANITOBA—J. B. SKAPTASON, Inspector

Manitoba special fishery.....	1,499 (1 cancelled)
Manitoba settler's permits.....	922
Manitoba commercial sturgeon.....	88
Manitoba domestic sturgeon.....	10
Manitoba special angling permits for non-residents.....	19 (1 cancelled)
Receipt books.....	1,596 (4 cancelled)
	<hr/> 2,538 (2 cancelled)

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## SASKATCHEWAN—G. C. MACDONALD, Inspector

Kind of License—	Number issued
Domestic sturgeon.....	7
Commercial sturgeon.....	10
Saskatchewan Domestic fishery.....	92
Saskatchewan commercial and fishermen's licenses.....	477
Saskatchewan Indian and half-breed permits.....	573
Receipt books.....	586
	<hr/> 1,159

## ALBERTA—A. G. WILLSON, Inspector

Fish cannery.....	1	
Angling permits.....	3,266	(7 cancelled and 6 free)
Alberta domestic fishery.....	135	(16 cancelled)
Alberta commercial and fishermen's.....	636	(1 cancelled)
Alberta Indian and Half-Breed permits.....	195	
Receipt books.....	770	
	<hr/> 4,233	(24 cancelled and 6 free)

## BRITISH COLUMBIA—J. A. MOTHERWELL, Inspector

Fish cannery.....	13	(4 cancelled)
British Columbia angling permits.....	51	
British Columbia Indian permits.....	106	(1 cancelled)
Abalone fishery.....	2	
Crab fishery licenses.....	159	(1 cancelled)
Smelt or sardine fishery.....	67	
British Columbia gill-net, drift-net or drag-seine licenses operated in conjunction with power boats.....	426	
British Columbia herring or pilchard gill-net or drift-net.....	57	
British Columbia herring drag-seine.....	1	
British Columbia herring purse-seine.....	27	
Herring drag-seine or purse-seine for halibut fishing vessels.....	Nil	
British Columbia sturgeon fishery licenses.....	5	
British Columbia trolling licenses.....	1,495	(30 cancelled)
British Columbia salmon gill-net or drift-net.....	4,779	(1 cancelled ) no refund
British Columbia salmon trap-net license.....	8	
Salmon purse-seine license.....	66	(7 cancelled)
License to a captain of a salmon purse-seine boat.....	47	
British Columbia salmon drag-seine.....	35	(1 cancelled)
Salmon cannery licenses.....	56	
British Columbia salmon curing licenses.....	38	(4 cancelled)
Boat licenses for buy fresh salmon from fishermen.....	222	
License to a person engaged in cold storage or fish packing to buy fresh salmon from fishermen.....	102	(2 cancelled)
British Columbia reduction works licenses.....	7	
Whale factory licenses.....	3	
	<hr/> 7,772	(51 cancelled)

## YUKON TERRITORY

Yukon special fishery.....	30	(3 cancelled)
Total number issued.....	<hr/> 39,129	(149 cancelled and 50 free)

## SESSIONAL PAPER No. 29

The following is a statement showing the number of prosecutions, confiscations and sales which took place in each province, during the 1921-22 season:—

Province	No. of Prosecutions	Revenue received	No. of Confiscations	Revenue from Sales
		\$ cts.		\$ cts.
Ontario (fines).....	3	30 00		851 30
Quebec.....	23	250 00	19	134 46
Prince Edward Island.....	34	325 00	14	62 75
Nova Scotia—				
District No. 1.....	8	66 00	20	19 50
District No. 2.....	99	1,239 00	77	402 62
District No. 3.....	40	321 01	30	33 82
New Brunswick—				
District No. 1.....	19	232 00	57	
District No. 2.....	27	342 00	165	524 10
District No. 3.....	49	965 00	36	224 55
Manitoba.....	54	541 00	114	297 31
Alberta.....	27	142 00	20	78 30
Saskatchewan.....	37	256 00	49	535 31
British Columbia—				
District No. 1.....	59	903 50	29	2,195 91
District No. 2.....	59	545 00	49	303 09
District No. 3.....	20	195 00	20	178 80
Yukon Territory.....	Nil		Nil	
Total.....	558	6,352 51	699	5,891 82

## APPENDIX No. IV.

LIST of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the year ended December 31, 1921.

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for Entry	Quantity of Fish landed
					cwt.
Acushla.....	70	23	3	Shelter, bait.....	
Adeline.....	54	20	3	Shelter.....	
A. D. Willard.....	23	8	1	".....	
Agnes.....	65	19	3	".....	
Albert W. Black.....	51	11	7	" supplies.....	
Alice May.....	11	6	6	".....	
Alice Wilson.....	16	7	2	".....	
A. M. Doughty.....	15	9	3	".....	
American.....	93	22	2	".....	
Anastasia E.....	16	7	1	".....	
Angeline C. Nunan.....	58	19	7	".....	
Angie B. Watson.....	36	17	8	".....	
Arthur James.....	95	19	1	".....	
Audrey & Theo.....	15	7	1	".....	
Aviator.....	210	34	3	" supplies.....	
Bay State.....	81	25	6	Landing fish, supplies.....	63
Benjamin A. Smith.....	75	25	14	Supplies, shelter, bait.....	
Benjamin W. Wallace.....	49	19	2	Shelter.....	
Bettina.....	66	17	1	".....	
Catharine.....	77	27	6	Landing fish, supplies.....	61
Catharine Burke.....	68	20	10	Shelter.....	
Cavalier.....	96	22	11	Supplies, bait.....	
Commonwealth.....	93	24	8	Shelter.....	
Constellation.....	89	19	16	" supplies.....	
Corinthian.....	97	25	8	".....	
Dawn.....	79	23	4	".....	
Desire.....	21	10	2	" landing fish.....	7
E. A. Burns.....	14	6	2	".....	
Edith Silveria.....	47	20	3	".....	
Edith H. Cooney.....	12	6	6	" landing fish, supplies.....	5
Edith C. Rose.....	70	21	3	".....	
E. H. M. Burns.....	18	8	1	".....	
E. H. Mildred.....	41	10	1	".....	
Eleanor.....	36	9	2	".....	
Elizabeth A.....	34	8	5	".....	
Eliza A. Benner.....	14	6	2	Supplies.....	
Elizabeth M. King.....	13	8	6	Shelter.....	
Elizabeth W. Nunan.....	48	17	15	" supplies.....	
Elk.....	66	21	4	".....	
Elmer E. Gray.....	71	21	4	".....	
Elsie.....	93	25	7	".....	
Elsie G. Silva.....	50	20	15	" supplies.....	442
Elva L. Spurling.....	49	19	4	".....	
Ella and Mildred.....	41	10	1	Supplies.....	
Ellen T. Marshall.....	75	22	13	" bait, landing fish.....	173
Emelia D.....	10	6	6	" shelter, landing fish.....	9
Emerald.....	5	5	1	Shelter.....	
E. M. King.....	13	8	4	".....	
Esperanto.....	91	25	4	".....	
Ethel.....	14	7	8	".....	
Etta M. Burns.....	18	8	5	".....	
Etta Mildred.....	41	15	3	" supplies.....	
Evelyn and Ralph.....	38	9	1	".....	
Evelyn and Ralph.....	16	9	6	" supplies.....	
Fannie E. Prescottt.....	74	23	14	" supplies, bait, landing fish.....	192
Flora L. Oliver.....	59	23	10	" supplies, landing fish.....	83
Frances Lenor.....	12	5	1	".....	
Frances S. Grueby.....	94	25	5	".....	
Funchal.....	20	8	3	".....	
Genesta.....	53	20	2	".....	

## SESSIONAL PAPER No. 29

LIST of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for entry	Quantity of Fish landed cwt.
Gladiator.....	75	6	1	Supplies.....	
Good Luck.....	55	19	20	" shelter, landing fish.....	1
Governor Marshall.....	60	21	1	Shelter.....	
Harmony.....	66	18	9	" bait, supplies.....	
Harvard.....	72	19	1	" .....	
Hazel Jackson.....	26	8	2	" .....	
Helena.....	40	17	1	" .....	
Helja Silva.....	77	21	2	Supplies.....	
H. E. Murley.....	5	5	4	Shelter.....	
Henrietta.....	62	17	13	" bait, supplies.....	
Herbert Parker.....	78	21	14	Supplies, landing fish.....	1
Hesperus.....	79	25	1	Shelter.....	
Higco.....	12	6	6	" .....	
Hortense.....	43	19	5	" bait, supplies.....	
Ingomar.....	85	23	31	" supplies.....	
Imperator.....	79	23	11	" " landing fish.....	16
James R. Clark.....	36	18	5	" .....	
Jeanette.....	51	19	8	" bait.....	
Joffre.....	80	25	7	" bait, supplies.....	
John A. Casey.....	14	8	1	" .....	
John A. Cooney.....	14	8	4	" supplies.....	
John J. Fallon.....	60	19	5	" landing fish.....	49
Joseph Warner.....	11	6	7	" supplies.....	
Judique.....	89	8	1	" .....	
Killarney.....	73	23	11	Supplies, shelter.....	
Lafayette.....	12	8	5	Shelter.....	
L. A. Dunton.....	94	23	6	" supplies.....	
Laura Goulart.....	73	21	3	" .....	
Lizzie A.....	33	7	1	" .....	
Lochinvar.....	34	9	4	" supplies.....	
Lois H. Corkum.....	34	12	4	" landing fish.....	662
Louisa B. Marshall.....	74	21	3	" supplies.....	
Louisa R. Sylva.....	92	23	10	" " bait.....	
Lucia.....	43	19	14	" landing fish.....	1
Mabel E. Bryson.....	23	7	1	" .....	
Malicia Enos.....	8	5	5	" .....	
Margaret.....	73	18	4	" supplies.....	
Marion McLoon.....	11	7	9	" " landing fish.....	52
Marsala.....	46	18	1	" .....	
Marshall Foch.....	64	23	8	Supplies, bait, landing fish.....	14
Mary E. Hart.....	77	19	1	Shelter.....	
Mary F. Curtis.....	65	23	4	" .....	
Mary T. Fallon.....	48	15	3	" supplies.....	
Mayflower.....	113	25	14	" bait, supplies, landing fish.....	73
Medric.....	189	21	1	" .....	
Mildred Robinson.....	73	21	14	" supplies, landing fish.....	217
Minerva.....	13	6	9	" .....	
Monarch.....	83	23	10	" " bait.....	
Morning Star.....	85	22	5	Supplies, landing fish.....	114
Motor.....	17	9	4	" .....	
Natalie.....	13	6	4	Shelter.....	
Natalie Hammond.....	51	21	4	" .....	
Nickerson.....	9	6	2	" .....	
Nirvana.....	50	12	2	" .....	
Nyoda.....	28	12	2	" landing fish.....	207
On Time.....	12	5	1	" .....	
Oretha F. Spinney.....	87	24	7	Bait, supplies, landing fish.....	197
Orion.....	39	15	2	Shelter.....	
Philip P. Manta.....	43	18	2	" .....	
Pilot.....	18	8	2	" supplies.....	
Pioneer.....	84	19	5	" .....	
Pioneer.....	53	19	4	Supplies, shelter.....	
Pollyanna.....	66	19	1	Shelter.....	
Ralph Brown.....	67	19	2	Bait, supplies.....	
Reliance.....	22	9	1	Shelter.....	
Reliance.....	9	4	4	" .....	
Restless.....	15	8	4	" .....	
Republic.....	48	19	4	Supplies, bait.....	

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LIST of United States Fishing Vessels which entered Canadian Ports on the Atlantic Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for entry	Quantity Fish landed cwt.
Reveira.....	23	9	1	Shelter.....	
Rex.....	75	23	12	“ supplies, bait.....	
Rhodora.....	70	19	3	“ bait.....	
Robert and Arthur.....	67	21	2	“ .....	
Ruth.....	49	18	2	“ .....	
Ruth and Margaret.....	77	23	4	“ supplies.....	
Sadie M. Nunan.....	36	21	9	“ .....	
Satellite.....	4	3	1	“ .....	
Squanto.....	81	19	18	“ supplies, landing fish.....	1,350
Stilletto.....	91	19	4	“ .....	
Stranger.....	26	8	4	“ .....	
Sunapee.....	18	8	2	“ .....	
Thelma.....	28	12	6	“ .....	
Thos. S. Gorton.....	92	22	2	“ supplies.....	
T. M. Nicholson.....	90	9	1	“ .....	
Undercliff.....	47	8	4	“ supplies.....	
Vagrant.....	9	7	3	“ .....	
Victor.....	75	19	5	“ supplies.....	
Vida McKeown.....	83	19	2	“ .....	
Viking.....	34	16	9	“ .....	
Waldo L. Stream.....	66	21	10	Supplies, bait, landing fish.....	77
Waltham.....	44	21	10	Shelter.....	
W. H. Reid.....	9	4	1	“ .....	
Woiee.....	9	6	4	“ .....	
Wesley W. Sennett.....	11	7	7	“ supplies.....	
W. W. Smith.....	11	6	2	“ .....	
Yankee.....	96	25	1	“ .....	

LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1921.

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for entry	Quantity of Fish landed cwt.
A. K.....	7	2	8	Shelter, bait.....	
Active.....	4	2	1	Supplies.....	
Actor.....	7	2	2	Landing fish.....	100
Adele.....	4	2	2	“ supplies, bait.....	20
Adeline.....	6	2	1	“ .....	580
Agnes.....	17	5	3	Bait, shelter.....	
Alaska.....	44	15	5	Landing fish, supplies, bait.....	2,780
Albatross.....	40	13	13	Shelter, supplies, bait, landing fish..	2,560
Albatross.....	16	5	1	Landing fish.....	1,800
Alf.....	28	6	1	“ .....	140
Alfa.....	5	2	1	“ .....	40
Alfa.....	12	5	4	“ bait.....	240
Alice B.....	13	5	4	“ .....	220
Almera.....	3	2	1	Supplies.....	
Alph.....	4	3	2	Landing fish, shelter.....	120
Alten.....	43	15	9	“ supplies.....	4,280
America.....	25	11	11	Bait.....	
Annie.....	11	4	1	Landing fish.....	80
Anna J.....	22	5	5	Shelter, bait.....	
Anna J. Larsen.....	25	11	4	Bait.....	
Antler.....	22	5	14	Landing fish, bait.....	220
Apache.....	4	1	1	Shelter.....	
Arctic.....	29	4	1	Landing fish.....	2,960
Arcade.....	14	4	12	“ bait.....	80
Ariel.....	7	2	1	Shelter.....	
Arthur.....	4	2	1	Landing fish.....	20
Astrea.....	4	2	1	Shelter.....	
Atlas.....	31	17	7	Landing fish, supplies, bait.....	1,680
Atlantic.....	25	11	10	“ bait.....	260
Augusta.....	19	5	1	“ .....	1,300

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LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for entry	Quantity Fish landed cwt.
Aurora.....	20	5	1	Bait.....	
Aurora.....	13	5	12	Landing fish, bait.....	140
Ava.....	3	2	1	Supplies.....	
Avona.....	9	4	1	Landing fish.....	120
Baldy.....	7	2	1	".....	23
Baltic.....	20	5	1	".....	1,160
Bartolome.....	4	3	1	".....	640
Beaver.....	17	5	1	".....	42
Beaver.....	9	4	7	" bait.....	280
Ben.....	8	3	1	Supplies.....	
Bernice.....	4	2	2	Landing fish.....	60
Billie M.....	14	4	1	Supplies.....	
Bill 2.....	4	2	1	".....	
Bravo.....	5	3	1	Landing fish.....	720
Bring Gold.....	12	4	2	" supplies.....	1,440
Brothers.....	13	5	2	".....	1,500
Bryan.....	15	4	1	".....	620
Buckeye.....	10	3	1	Shelter.....	
Bucky.....	4	1	1	".....	
C. & B. 673.....	4	2	1	Supplies.....	
California.....	20	5	6	" landing fish, bait.....	900
Cape Clear.....	13	4	7	" ".....	680
Cape Spencer.....	11	3	1	Landing fish.....	240
Caroline.....	18	5	1	".....	740
Castle.....	4	2	1	Shelter.....	
Castor.....	6	2	2	Landing fish.....	80
Cedric.....	19	3	1	".....	2,160
Chancellor.....	13	4	3	" supplies.....	1,020
Chimera.....	9	4	12	" bait.....	240
Christine.....	4	2	2	".....	40
Christiana.....	4	2	1	".....	20
Circle H.....	4	2	1	".....	220
Clara.....	6	3	1	".....	200
Clara.....	4	2	1	".....	40
Columbia.....	32	4	1	".....	180
Comet.....	5	2	1	Supplies.....	
Commonwealth.....	60	17	3	" landing fish.....	4,540
Companion.....	9	2	5	Shelter.....	
Confidence.....	22	4	1	Landing fish.....	1,680
Constitution.....	39	13	14	Bait.....	
Convention.....	20	5	8	Bait, supplies, shelter, landing fish.....	1,120
Cora.....	4	2	1	Landing fish.....	480
Corona.....	19	5	2	".....	1,580
Coyote.....	4	2	1	Shelter.....	
Crescent.....	8	4	2	Landing fish, supplies.....	860
Daily.....	26	6	4	" bait, supplies.....	1,340
Daisy.....	18	6	3	".....	1,600
Dall 2.....	4	2	1	Shelter.....	
Decision.....	13	5	1	".....	
Defence.....	20	8	7	Landing fish, supplies, bait.....	1,160
Defiance.....	20	5	2	Bait.....	
Delaware.....	8	3	1	Landing fish.....	180
Democrat.....	27	6	3	".....	2,320
Dependent.....	5	4	1	".....	60
Diamond T.....	8	2	1	".....	1,020
Dick.....	10	5	9	" bait.....	80
Dip.....	4	2	6	" supplies.....	100
Director.....	12	5	2	" supplies.....	1,040
Discovery.....	10	5	6	Supplies, bait.....	
Dolphin.....	7	2	1	Landing fish.....	180
Dora H.....	15	5	3	Bait.....	
Dorothy.....	11	2	1	Landing fish.....	240
Dot.....	3	2	1	Shelter.....	
Duck.....	4	1	2	Supplies.....	
Eagle.....	28	6	4	Landing fish, bait.....	6,660
Eagle.....	15	6	2	".....	480
Eagle.....	9	4	2	" supplies.....	1,220
Eastern Point.....	4	3	1	".....	700
Ed.....	3	2	4	Bait.....	
Ed. 904 K.....	3	2	1	".....	

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LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for entry	Quantity Fish landed cwt.
Edna.....	6	2	1	Supplies.....	
Edna L.....	4	1	1	Shelter.....	
Eidsvold.....	15	5	6	Landing fish, bait.....	360
Elaine.....	6	3	1	".....	60
Eleanor.....	16	5	5	Bait.....	
Eleanor D.....	8	2	1	Supplies.....	
Elfin.....	4	2	1	Landing fish.....	120
Eloise.....	8	2	1	".....	60
Elsie.....	5	2	3	" bait.....	20
Emblem.....	4	2	1	".....	220
Elsinore.....	23	3	1	".....	340
E. Neilson.....	15	4	1	".....	660
Evelyn.....	4	2	2	Shelter, supplies.....	
Evolution.....	17	5	11	Landing fish, bait.....	60
Fairway.....	19	5	3	" supplies.....	660
F. C. Hergert.....	15	13	15	" bait.....	300
Fighting Bob.....	3	2	3	" supplies.....	100
Fisher.....	14	5	1	".....	1,600
Fisher.....	8	1	1	".....	100
Flattery.....	10	3	1	".....	220
Flamingo.....	13	5	5	Bait, supplies.....	
Fliver.....	5	1	1	Shelter.....	
Flo.....	4	1	1	".....	
Florence.....	38	11	7	Landing fish, bait.....	620
Fortuna.....	21	5	3	".....	360
Forward.....	18	5	5	".....	1,420
Fram.....	4	2	2	" supplies.....	240
Get the Hook.....	10	2	1	".....	100
Glacier.....	12	4	1	".....	500
Gladstone.....	23	6	1	".....	840
Gony.....	12	5	6	" supplies, bait.....	300
Golden North.....	19	5	1	".....	160
Grant.....	5	2	2	".....	160
Grayling.....	15	5	11	" bait.....	880
Groth.....	7	3	9	" supplies.....	260
H. & R.....	4	3	1	Landing fish.....	700
Hanna.....	11	5	4	Supplies, bait.....	
Happy.....	12	4	1	Landing fish.....	700
Harding.....	19	5	7	Bait.....	
Harvester.....	15	5	4	Landing fish, supplies.....	240
Harry.....	7	2	1	Shelter.....	
Hazel.....	24	5	1	Bait.....	
Hazel.....	7	4	2	" landing fish.....	280
Helen A.....	8	3	1	Landing fish.....	120
Helen D.....	8	3	2	".....	320
Helena.....	15	4	1	".....	320
Helgeland.....	56	15	2	" Bait.....	3,020
Hicks.....	7	2	1	Supplies.....	
Hilda.....	10	3	2	Landing fish.....	680
Hi Gill.....	6	4	1	".....	820
Holdal No. 2.....	4	4	1	".....	720
Hope.....	7	2	2	".....	29
If. 2.....	4	1	1	Shelter.....	
Igloo.....	11	1	1	Landing fish.....	260
Imperial.....	19	5	15	" bait.....	140
Inverness.....	16	8	1	".....	160
Irene.....	8	3	1	Bait.....	
Iris.....	9	3	1	Landing fish.....	20
Jean.....	9	2	1	Supplies.....	
Jeannette.....	6	2	3	" Landing fish, bait.....	260
Jennie.....	16	3	2	Shelter.....	
Jennie F. Decker.....	16	8	17	Landing fish, bait.....	640
Johanna.....	16	5	2	" supplies.....	740
J. P. Todd No. 1.....	4	2	1	".....	340
J. P. Todd No. 2.....	12	5	2	" supplies.....	680
June.....	15	4	2	".....	1,020
June.....	7	1	1	".....	40
June.....	4	1	1	".....	20
K. 736.....	4	2	1	Landing fish.....	40

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List of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage	Number of Men in Crew	Number of times entered	Reasons for entry	Quantity Fish landed
					cwt.
Katella.....	16	5	3	Bait.....	
Kayak.....	8	3	9	".....	
Kaydee.....	5	2	1	Supplies.....	
Kennebec.....	4	3	1	Landing fish.....	300
King & Wing.....	97	19	3	" supplies.....	3,040
Kodiak.....	38	13	19	" bait.....	4,300
681 L.....	2	1	1	Landing fish.....	4
Lansing.....	16	5	1	".....	580
La Paloma.....	14	11	24	" bait, supplies.....	1,160
Laura.....	7	3	2	" supplies.....	380
Lebanon.....	14	5	10	" bait.....	260
Lenore.....	14	4	1	".....	780
Leonine.....	24	5	1	Shelter.....	
Liberty.....	44	15	8	Landing fish, bait.....	2,240
Lief No. 2.....	21	4	1	".....	980
Lincoln.....	28	5	13	" bait.....	1,240
Lincoln.....	4	3	1	".....	320
Louise.....	16	5	10	Bait.....	
Lovera.....	4	2	1	Landing fish.....	540
Lummen.....	10	4	1	".....	780
Mackerel.....	8	2	1	Landing fish.....	440
Madeline J.....	21	5	2	Bait.....	
Mars.....	9	4	2	Landing fish, supplies.....	760
Margaret.....	5	2	3	".....	47
Margaret No. 1.....	12	3	1	".....	220
Margaret T.....	10	4	2	Bait.....	
Mary.....	16	8	17	" landing fish.....	380
Mary.....	5	3	1	Shelter.....	
Mary.....	3	1	1	".....	
Mary L.....	7	2	1	Landing fish.....	12
Mermaid.....	19	5	13	Supplies, bait.....	
Mildred.....	19	8	14	Bait.....	
Mildred No. 2.....	31	8	7	" landing fish.....	60
Mine.....	6	2	1	Shelter.....	
Minnie Berna.....	10	4	1	Bait.....	
M. K.....	4	2	2	Supplies, bait.....	
Molde.....	7	3	9	Bait.....	
Mongolia.....	25	4	1	Landing fish.....	240
Moringen.....	17	6	1	".....	580
Myra.....	4	3	1	".....	320
Myrtle.....	9	4	8	" bait.....	240
National.....	20	5	13	Landing fish, supplies, bait.....	180
New England.....	70	27	3	".....	3,700
New Zora.....	26	4	1	".....	880
Nidaross.....	23	5	2	" supplies, bait.....	1,920
Nomad.....	15	4	6	" ".....	220
Nootka.....	30	4	1	Bait.....	
Norland.....	19	6	1	Landing fish.....	1,220
Norma.....	6	3	1	".....	800
North.....	9	3	10	Bait, shelter.....	
North Cape No. 2.....	4	3	1	Landing fish.....	40
North Pole.....	4	2	1	".....	60
Nuzon.....	19	4	1	".....	800
Ocean.....	18	5	1	Bait.....	
Ocean Wave.....	10	2	1	".....	
Olympic.....	30	11	1	Landing fish.....	2,140
Omany.....	34	13	1	".....	3,000
Onah.....	18	5	6	" supplies, bait.....	540
Orient.....	48	13	13	" ".....	2,660
Pacific.....	26	11	16	Landing fish, bait.....	220
Pal.....	4	2	1	Supplies.....	
Panama.....	34	13	13	" bait, landing fish.....	6,220
Pegge.....	4	4	1	Landing fish.....	60
Pelican.....	17	5	2	" supplies.....	1,080
Pershing.....	18	5	14	Bait.....	
Phoenix.....	15	2	1	Landing fish.....	660
Pilot.....	9	3	1	".....	100
Pioneer.....	48	15	1	".....	4,020
Pioneer No. 3.....	26	5	10	" bait.....	440

LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage in Crew	Number of Men	Number of times entered	Reasons for entry	Quantity of Fish landed
					cwt.
Pirate.....	20	4	1	Landing fish.....	720
Polaris.....	45	15	6	" supplies.....	4,140
Portage.....	4	2	1	Shelter.....	
President.....	24	6	6	Landing fish, bait.....	220
Preslio.....	14	5	2	Bait.....	
Presto.....	14	5	1	Supplies.....	
Primrose.....	3	1	1	Bait.....	
Prospector.....	50	15	1	Landing fish.....	2,580
Progress.....	5	2	1	Shelter.....	
Puget.....	4	1	1	".....	
Queen.....	15	3	1	Landing fish.....	40
Queen.....	4	1	1	Shelter.....	
Rainier.....	4	3	1	Landing fish.....	460
Rambler.....	10	5	1	".....	140
Reform.....	4	3	1	".....	420
Regal.....	3	1	1	Shelter.....	
Reliance.....	14	4	1	Landing fish.....	1,260
Reliance No. 1.....	19	6	2	" supplies.....	1,840
Reliance.....	7	3	2	".....	1,040
Republic.....	51	16	7	".....	7,880
Rescue.....	6	3	1	".....	100
Restitution.....	24	5	4	" supplies, bait.....	700
Roald.....	12	2	1	Supplies.....	
Roald Amundsen.....	16	5	1	" landing fish.....	260
Roamer.....	5	2	1	Bait.....	
Rolf.....	10	4	1	Landing fish.....	900
Rolfe.....	3	1	4	Shelter, bait.....	
Rolph.....	6	3	1	Supplies.....	
Roosevelt.....	13	5	0	" bait, landing fish.....	240
Roasario.....	16	5	11	Landing fish, bait.....	300
Royal.....	15	5	1	Bait.....	
Ruth.....	5	2	1	".....	
Sadie K.....	13	5	1	Landing fish.....	420
Salmon.....	20	5	1	Shelter.....	
Sammy.....	8	3	9	Landing fish, supplies, bait.....	200
Samson.....	7	3	2	".....	980
Scandia.....	79	19	5	".....	1,880
Scapp.....	11	2	2	Shelter, bait.....	
Scout.....	4	2	2	Landing fish, bait.....	40
Seabird.....	14	2	1	".....	260
Seattle.....	55	14	7	" supplies, bait.....	4,280
Sea Lion.....	6	2	1	".....	60
Selam.....	3	5	1	".....	3
Selca.....	18	3	1	".....	240
Senator.....	11	11	5	" supplies, bait.....	2,240
Sentinel.....	21	6	5	" bait.....	1,920
Service.....	37	7	1	Supplies.....	
Seymour.....	44	15	1	Landing fish.....	2,420
Sherman.....	18	5	1	".....	1,280
Signal.....	13	4	1	".....	420
Siloam.....	16	8	16	" supplies, bait.....	1,340
Silver Wave.....	12	3	1	".....	20
Sirius.....	17	2	1	".....	360
Sitka.....	50	15	1	".....	660
Speculator.....	9	3	4	" supplies.....	960
Spencer.....	17	5	2	".....	1,420
S. & S.....	4	3	1	".....	280
Stamsund.....	14	3	1	".....	1,580
Stanley.....	15	5	1	".....	280
Star.....	12	4	1	".....	1,600
Star.....	7	3	2	Supplies.....	
Stranger.....	6	2	1	Landing fish.....	80
Success.....	4	3	1	".....	200
Sumner.....	24	13	1	".....	920
Sun Wing.....	15	5	4	Supplies, bait.....	
Suomni.....	8	2	1	Landing fish.....	100
Superior.....	16	5	5	" bait.....	180
Swift.....	7	2	1	Bait.....	
Swiftsure.....	22	5	2	" landing fish.....	820

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List of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1921.—*Con.*

Name of Vessel	Tonnage in Crew	Number of Men	Number of times entered	Reasons for entry	Quantity of Fish landed
T. 524.....	4	2	1	Landing fish .....	cwt. 60
T. 802.....	4	3	1	" .....	40
T. 966.....	3	1	1	Shelter .....	
T. 981.....	4	1	1	Landing fish .....	20
Tahoma.....	18	11	4	" supplies, bait.....	980
Taku Jack.....	9	2	1	Shelter .....	
Tani.....	3	1	5	" landing fish, bait.....	5
Tatoosh.....	24	6	2	Landing fish, bait.....	1,880
Teddy J.....	13	4	1	" .....	1,560
Tell.....	4	2	1	" .....	60
Texas.....	16	5	9	" bait .....	140
Texas.....	4	2	1	Shelter .....	
Thelma M.....	7	2	1	Landing fish .....	200
Thelma No. 2.....	26	5	6	" supplies, bait.....	60
Thor.....	4	2	1	" .....	40
Tillicum.....	21	5	12	" bait .....	80
Tom and Al.....	57	15	6	" " supplies.....	6,400
Tordenskjold.....	39	19	10	" " " .....	3,280
Tremont.....	10	4	1	Bait.....	
Trio.....	19	5	3	Landing fish, supplies, bait.....	360
Tyee.....	12	4	5	" bait .....	1,120
Umatilla.....	8	3	3	Landing fish, bait.....	120
Unimak.....	10	3	1	" .....	180
Uranus.....	15	5	4	" bait .....	980
Valera.....	6	2	3	Shelter, supplies, bait.....	
Valid.....	8	3	5	Landing fish, supplies, bait.....	340
Valorous.....	21	4	1	Shelter.....	
Vansec.....	43	15	12	Landing fish, supplies, bait.....	3,160
Venus.....	4	3	1	" .....	600
Verna A.....	4	2	1	Shelter.....	
Vesta.....	13	4	3	Landing fish, supplies, bait.....	1,720
Victor.....	3	1	1	" .....	20
Viking.....	6	3	2	" supplies.....	1,300
Virginia.....	33	6	2	" .....	2,000
Vivian.....	9	4	1	" .....	380
Vivian.....	5	3	1	" .....	60
Volunteer.....	19	5	13	" bait .....	420
Wabash.....	6	3	1	Landing fish.....	100
Wasa.....	9	2	1	Shelter.....	
Washington.....	24	11	5	Landing fish, supplies, bait.....	1,460
Washington.....	15	5	3	" bait.....	740
Wave.....	7	3	1	" .....	800
Ways.....	7	3	1	" .....	80
Westford.....	17	5	4	" bait.....	340
White Star.....	17	4	1	" .....	660
Wildwood.....	13	2	1	" .....	40
Wilhelmina.....	17	5	12	" bait.....	220
Wireless.....	19	5	16	" " supplies.....	240
Wilson.....	19	5	6	" " .....	380
Woodrow.....	23	5	9	" " supplies.....	440
Yakutat.....	41	13	18	Landing fish, supplies, bait.....	3,240
Yankee.....	10	3	1	" .....	80
Yellowstone.....	20	5	4	" supplies, bait.....	560
Yule.....	6	2	3	" " " .....	60
Zebellos.....	10	5	1	Bait.....	
Zilla May.....	56	15	1	Landing fish.....	360
Zora.....	16	5	1	" .....	360



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FIFTY-SIXTH  
ANNUAL REPORT  
OF THE  
FISHERIES BRANCH

Department of Marine and Fisheries

FOR THE YEAR

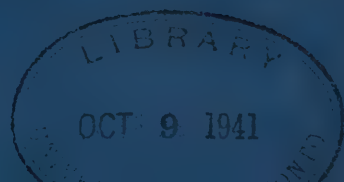
1922-23

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1923

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ANNUAL REPORT  
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FOR THE YEAR

1922

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OTTAWA  
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PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
1922



*To General His Excellency the Right Honourable Lord Byng of Vimy, G.C.B.,  
G.C.M.G., M.V.O., Governor General and Commander in Chief of the  
Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-sixth annual report of the Fisheries Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

E. LAPOINTE,

*Minister of Marine and Fisheries.*

DEPARTMENT OF MARINE AND FISHERIES,

OTTAWA, AUGUST, 1923.



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## DEPUTY MINISTER'S REPORT

To the Honourable ERNEST LAPOINTE,  
Minister of Marine and Fisheries.

SIR,—I have the honour to submit the Fifty-sixth Annual Report of the Fisheries Branch of the Department, which is for the fiscal year ended March 31, 1923.

The report deals with the following subjects:—

- Review of the Fisheries of 1922.
- Operation of the Fish Inspection Act.
- Operation of the Meat and Canned Foods Act.
- Fisheries Statistics.
- Bait Reporting Service.
- Scouting for Mackerel.
- British Columbia Fisheries Commission.
- Fishing Bounty.
- Fish Culture.
- Work of Biological Stations.
- Natural History Observations.
- International Committee on Deep Sea Investigations.

Appendices to the report include the following:—

- Reports of the Chief Inspectors of Fisheries.
- Fisheries Expenditure and Revenue.
- Summary of Licenses Issued.
- Entries of United States Fishing Vessels.

### REVIEW OF THE FISHERIES OF 1922

The prosecution of the fisheries on the Atlantic and Pacific Coasts during 1922 was attended with greater success than in the preceding year. The aggregate catch was considerably higher. The results of operations on the inland lakes of Ontario and the West were, on the other hand, not quite so good as in the year before. The total marketed value of the fisheries of the whole of Canada for the year under review was nearly \$7,000,000 greater than that for 1921. The year 1921, however, was by much the poorest in value since 1914. Compared, therefore, with the value for 1920, that of 1922 is over \$7,000,000 less, while, if the results of the year under review are compared with those of the year preceding the great war, an increase of over \$8,000,000 will be found. The following table shows the contribution of the various provinces to the total value of the year being reviewed and of the year preceding it:—

	1922	1921
Nova Scotia.....	\$ 10,209,258	\$ 9,778,623
New Brunswick.....	4,685,660	3,690,726
Prince Edward Island.....	1,612,599	924,529
Quebec.....	2,089,414	1,815,284
Ontario.....	2,858,122	3,065,042
Manitoba.....	908,816	1,023,187
Saskatchewan.....	245,337	243,018
Alberta.....	331,230	408,868
British Columbia.....	18,849,658	13,593,670
Yukon Territory.....	10,107	28,988
	<u>\$ 41,800,210</u>	<u>\$ 34,931,925</u>

## ATLANTIC FISHERIES

*Cod, Haddock, Hake and Pollock.*—The aggregate catch of these fish on the whole Atlantic coast of Canada amounted to 3,045,000 cwts. This is 536,000 cwts. greater than the catch in 1921 and 338,000 cwts. greater than that in 1920. The increase is due to cod mainly, the catch of which was over 300,000 cwts. greater. The haddock catch exceeded that of the preceding year by 38,000 cwts., while the catch of hake was greater by 60,000 cwts. and of pollock by 20,000 cwts.

*Mackerel, Herring and Sardines.*—Mackerel were very plentiful in the spring along the Nova Scotia coast and at the Magdalen islands. The catch in all the provinces was 100,000 cwts. greater than that of the preceding year. The increase in Nova Scotia amounted to 75,000 cwts., while in Quebec, principally at the Magdalen islands, there was an increase of 28,000 cwts.

The herring catch was greater by 130,000 cwts. The increase was nearly all attributable to New Brunswick, as a result of improved conditions in the smoked herring business of the Bay of Fundy.

The sardine fishery has recovered slowly from the disastrous effects of the over supplies which clogged the markets a few years ago. There was an increase in the catch of 90,000 barrels.

*Other Sea Fish.*—The quantity of halibut landed was about the same as in the preceding year, which gave 7,600 cwts. more than in 1920. The catch of swordfish in 1921 was more than double that in 1920, while in 1922 it was nearly double that in 1921. The landings of albacore and flounders were slightly greater than those for the preceding year, while the catch of tomcod was about 4,000 cwts. less.

*Shell-fish.*—The quantity of lobsters taken during the year 1922 was 30,000 cwts. less than the catch in 1921. While the catch in the aggregate was less, three of the provinces gave an increased production, Prince Edward Island's catch being over 20,000 cwts. greater. To the western part of Nova Scotia is due the decreased total landing of lobsters. There, fishing begins early in spring, and, as the weather was much rougher in the spring months of 1922 than in those of 1921, operations were interrupted to a greater extent. The smaller catch was no doubt partly due also to the special fishery season granted in the fall of 1921. If the 30,000 cwts. taken at that time had been left uncaught, the catch of 1922 would have been greater possibly to that extent.

The catch of oysters was about the same as that in the preceding year. The beds in Richmond Bay, Prince Edward Island, which for some years past had not been producing, are now recovering and giving promise of a return to their old fertility.

There was a substantial increase in the catch of clams.

Scallops were taken in much greater quantities. The catch amounted to 10,700 barrels against 4,800 barrels in the preceding year. While the old scallop beds yielded their usual quota, new beds were discovered, especially on the Bay of Fundy side of Digby neck, which were vigorously and successfully operated on.

*River-Spawning Fish.*—The salmon fishery as a whole was slightly better than in the preceding year, the catch for 1922 being 36,300 cwts. against 33,800 cwts. for 1921. There was an increase of about 5,000 cwts. in the combined catches of Nova Scotia and Quebec, while the New Brunswick catch on the other

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hand was less by about 3,300 cwts. The total quantity taken in 1922 is above the average of the three preceding years. It falls considerably below the average of the five years preceding 1919 however.

The smelt fishery produced about the same quantity as in the year before.

Alewives or gaspereaux were more plentiful in the St. John Harbour district. The total catch as a consequence was almost three times greater than that for the preceding year.

## INLAND FISHERIES

The production of the chief kinds of commercial fish in inland waters, with the exception of pickerel from the lakes of the Prairie Provinces, was less than in the preceding year. The catch of whitefish was about 25,000 cwts. less, and of tullibee it was 16,000 cwts. less. The catch of pike, however, fell short by about 1,200 cwts. only and goldeyes by about 400 cwts. Pickerel on the other hand gave an increase of about 18,000 cwts.

The small catch of 1922 was due largely to the fact that the ice on the Western lakes was not sufficiently strong to permit operations thereon until late in the season.

The fisheries of Ontario in 1922 taken all over gave a somewhat greater production than in the preceding year, and there were increased catches of herring, trout and dore, but those of whitefish and blue pickerel were slightly less.

Fishing results in the St. John River district of New Brunswick were not quite so good as those for the year before.

## PACIFIC FISHERIES

*Salmon.*—The catch of 1922 was very much greater than that of the year before. The pack of all kinds of salmon in the year under review was in round figures 1,290,000 cases. This was double the pack of 1921. The pack of that year, however, was the smallest since 1908. The 1922 pack was also greater than the 1920 pack by 102,000 cases. On the other hand, the pack of 1922 was that much less than the one of 1919. It was also less than the packs of 1918 and 1917 by 326,000 and 267,000 cases respectively. The great increase in the 1922 pack over that in 1921 was derived chiefly from what are known as the cheaper varieties, pinks and chums. The pack of pinks in 1921 was 192,000 cases, whereas there were 581,000 cases packed in 1922. In 1921 there were 71,000 cases of chums packed, while in 1922, 258,000 cases were packed.

*Halibut.*—There were 293,000 cwts of halibut landed, against 325,000 cwts. for the year before. The catch of the year before, however, was very considerably greater than that of 1920. United States vessels, as usual, landed about two-thirds of the total catch, principally at Prince Rupert.

*Herring.*—These were abundant, and there was a greater quantity taken. The Oriental demand for herring in a dry salted state was good. During the winter season of 1922-23 a total of almost 160,000 boxes, each of which contained 400 pounds of fish, were salted and shipped across the Pacific. A considerable portion of the catch was used for baiting purposes by the halibut fishermen. A small portion was disposed of fresh and as kippers. The increase in the United States tariff practically cut off the chief market for herring cured in the Scotch style. Consequently, a few thousand barrels only were cured during the past season. Such as were cured in this way were packed in small packages for disposal in the home markets, especially those of the Western Provinces, where a satisfactory trade is being gradually worked up.

*Pilchards.*—These continue to be as abundant as ever on the west coast of Vancouver island. The bulk of the catch is canned. There were 19,000 cases packed in 1922, as against 16,000 in the year before.

*Other Sea Fish.*—The various kinds of cod were taken in about the same quantities as in the preceding year. The catch of flatfish was greater, there being 12,000 cwts. landed against 4,000 cwts. in the year before. Oysters, clams and crabs were taken in increased quantities.

*Whales and Seals.*—Two whaling stations were in operation during the year and 187 whales were captured. There were 930 fur seals taken during the season by the Indians along the coast.

#### INSPECTION OF FISH

During the year 1922 the work of inspection was carried on by a staff of three permanent and ten temporary, or seasonal inspectors on the Atlantic coast, and two seasonal inspectors on the Pacific coast. On the Atlantic coast, 64,000 barrels of herring, mackerel, gaspereau and salmon passed under the eyes of the inspectors who examined them as to the quality and construction of barrels, and the quality, grade and curing of the fish in accordance with the requirements of the Fish Inspection Act.

In addition to the actual work of inspections, packers and coopers were visited periodically and given instructions as to the requirements of the Act. Unfortunately the generally depressed conditions of the markets, together with the effect of the increased tariff imposed by the United States, caused sales of pickled fish to be exceedingly slow and at low rates during the year, notwithstanding the very great improvement in both barrels and fish that has been brought about by our system of inspection. Some are inclined to attribute this slowness of trading in some degree to a gradual getting away from eating pickled fish on the part of those who have hitherto consumed the bulk of our salted herring and mackerel.

Until the past season, pickled herring, mackerel, gaspereau and salmon and the barrels for such, only came under inspection. The Act, however, provides that any kind of cured fish may, by order in council, be made subject to inspection just as soon as necessity and wisdom warrant the taking of such a step. Under this provision it was found necessary last fall to take this step in connection with the dry salted herring trade of British Columbia. This is a very important and growing trade. The product is shipped across the Pacific to China. For some time this branch of the industry has been struggling with a difficulty due to the lack of uniformity in the curing of the fish, the size of the package and the weight of fish contained in them. In order, therefore, to remove those conditions, and with a view to stabilizing the business, a set of regulations was prepared and adopted, after consultation with the packers, by which a uniform method of curing and a standard size of package were established. During the past winter, therefore, curing and packing operations were carried on for the first time under the supervision of departmental inspectors. Approximately 160,000 boxes, each of which contained 400 pounds of fish, were examined by the inspectors. With each lot inspected and shipped, a certificate of inspection was given to the shipper. Our Trade Commissioner at Shanghai referring to this inspection system says: "It will go far to assist the sale of Canadian herring in China for which there is a large market, and also protect both the shipper and the buyer."

While inspectors have no specific authority to deal with the curing of cod, haddock, hake and such like fish, they are instructed to keep an eye on that branch of the industry and by reason of their position to point out defects and indicate improvements.

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A pamphlet entitled "The Dried Cod Fish Trade," which deals comprehensively with the business from the splitting and salting to the drying and marketing, was issued by the department last year as a guide to officers and to the trade generally. The pamphlet was distributed to individual fishermen and merchants both in the French and English languages, and no doubt will do much towards improving the standard of cure.

## INSPECTION OF CANNERIES AND CANNING FISH

The inspection of fish canneries, the raw material to be used therein, the whole process of canning, the canned product and the labelling and designating of such is carried on under the provisions of the Meat and Canned Foods Act and the regulations made thereunder.

This inspection aims at the extension of trade by improving the quality of the product and the protection of the public by preventing the packing of unsound fish and seeing that all cans of fish are correctly labelled. Imported canned fish is subject to inspection under the Act and must be in accordance with the provisions thereof as to soundness, weight and proper designation.

By a rational and judicious enforcement of the various requirements of the Act, a very marked improvement has been gradually brought about in recent years, not only in the conditions under which canning operations are carried on from a sanitary point of view, but in the quality of the canned product as well. For example, the huge salmon canning industry of British Columbia is now carried on under conditions that could not very well be greatly improved upon.

Numerous defects in buildings and equipment, more especially in lobster canneries, were remedied in the course of the year at the instigation of the inspecting officers.

A number of lightweight cans of lobsters, which were packed early in the season were seized and disposed of in accordance with the regulations, while several shipments of canned salmon, of the home as well as the imported product, were held because of improper labelling.

During the spring of 1922 it was discovered that the Act as well as the regulations, which were amended in 1917 and 1919, contained several sections which were either burdensome to the trade or incapable of proper application; consequently departmental officials met the packers and discussed the whole Act and the regulations with a view to amending both to such an extent as was necessary for the proper protection of the packers and the consuming public and for the betterment of the industry. In due course the amendments agreed upon were made law and became effective at the beginning of the packing season of 1923.

For a great many years a proportion of the annual pack of canned lobsters has caused trouble and loss to the trade because of a discoloration of the meat which took place after it had been in the cans for some time. The department, through the Research Council of Canada, has been endeavouring to find the cause of the discoloration and a result of investigations carried on by Dr. F. C. Harrison, Principal of MacDonald College, both the cause and the cure for it have been discovered. Information was duly conveyed to the industry by means of a pamphlet issued by the Research Council.

## FISHERIES STATISTICS

The work of collecting, compiling and publishing monthly, quarterly and annual statistics of the fisheries was carried on by the Fish Inspection and Statistical Branch through the means of the fishery officers as usual.

In the spring of 1922 an endeavour was made to secure from captains of deep-sea fishing vessels special statistical information as to the quantities and

kinds of fish taken by them on the various banks during the year. The information covered the number of actual fishing days, the location of the ground fished on each day, the catching power used and the quantity and kind of fish caught per day. The number of captains who complied with the department's request for this information was relatively small. It is hoped, however, that a greater number will co-operate next season.

With a view to securing more definite knowledge concerning the movements and size of the bodies of mackerel which strike the coast annually, our fishery overseers in the mackerel fishing districts of the Atlantic coast supplied the department during the season of 1922 with special weekly information covering the first appearance of the fish, the quantity of the various sizes taken, and the kinds of the gear used in their respective districts. The information is intended to be used by the Biological Board in connection with their investigations.

#### BAIT REPORTING SERVICE

The Bait Reporting Service which was instituted on the Atlantic coast in 1913, and which has since been in operation yearly, was again resumed with some modifications owing to changes in conditions which have arisen since the service was first inaugurated. Captains and owners of fishing vessels, as well as others interested, were by means of this service provided with information regarding the catch of bait at various points along the coasts of the Maritime Provinces and the Magdalen islands. Throughout the spring and summer officers of the department gathered information regarding the landing of bait, and submitted it daily by telegraph to certain ports where the information, in accordance with arrangements made, was posted in conspicuous places. The information was also published without charge by the Halifax daily papers. Throughout the spring monthly telegrams were forwarded from the Magdalen islands and North Sydney, Cape Breton, to Canso, Halifax and Lunenburg reporting ice conditions and bait supplies. During July and August, information regarding bait landed at points along the coasts of Halifax and Guysboro counties was telegraphed to North Sydney, Canso, Halifax, Lunenburg, Shelburne, Lockeport and Yarmouth. Similar reports were also forwarded from Lockeport to Halifax and Canso.

#### SCOUTING FOR MACKEREL

Fisheries protection cruisers, while following the movements of the United States mackerel purse-seining fleet, kept track, as in the preceding year, of the location and movement of the schools of mackerel, and sent wireless messages to shore daily, giving the results of their observations.

A full report on scouting and the movements of the fish by the captain of the cruiser *Arras* will be found on page 40.

#### BRITISH COLUMBIA FISHERIES COMMISSION INQUIRY

During the months of August and September, 1922, a commission consisting of certain members of the Standing Committee on Marine and Fisheries in the House of Commons investigated the fisheries conditions of British Columbia. The commission's report, which has already been published and distributed, contained a number of recommendations looking not only to the conservation of the fisheries resources of our Pacific province, but also to removing any disabilities under which the industry was being carried on. As a result of the inquiry, and in accordance with the commission's recommendations, several important changes in the regulations were made, which become effective during the season of 1923.

## FISHING BOUNTY

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1922, payment was made on the following basis:—

To owners of vessels entitled to receive bounty—\$1 per registered ton: payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty—\$6.95 each.

To owners of boats measuring not less than 13 feet keel—\$1 per boat.

To boat fishermen entitled to receive bounty—\$5.35 each.

There were 11,209 bounty claims received and 11,204 paid. In the preceding year, 11,674 bounty claims received and 11,654 paid.

The total amount paid was \$157,172.55, allocated as follows:—

To 624 vessels and their crews..... \$ 47,478 85

To 10,580 boats and their crews..... 109,693 70

## FISHING BOUNTY EXPENDITURE, 1922-23

County	Boats	Men	Amount	Ves- sels	Tons	Average tonnage	Men	Amount	Paid	Re- jected
			\$ cts.					\$ cts.		
Annapolis.....	149	260	1,540 00	3	152	51	47	478 65	152	
Antigonish.....	109	171	1,023 85						109	
Cape Breton.....	344	610	3,658 65	22	294	13	79	843 20	366	
Colchester.....	1	1	6 35						1	
Cumberland.....	5	7	42 45	1	11	11	2	24 90	6	
Digby.....	407	716	4,237 60	4	120	30	36	370 20	411	2
Guysboro.....	732	1,193	7,114 50	47	702	15	213	2,182 35	779	
Halifax.....	1,229	1,682	10,227 70	73	1,119	15	326	3,384 70	1,302	
Inverness.....	372	857	4,957 20	20	287	14	92	926 40	392	
Kings.....	44	70	418 50						44	
Lunenburg.....	608	748	4,609 75	142	8,269	58	2,086	22,853 70	750	
Pictou.....	40	52	318 20	1	17	17	4	44 80	41	
Queens.....	175	305	1,806 65	14	173	12	50	520 50	189	
Richmond.....	471	837	4,948 45	25	411	11	119	1,238 10	496	
Shelburne.....	564	1,091	6,400 80	26	686	26	192	2,020 40	590	
Victoria.....	273	413	2,482 45	10	144	14	36	394 20	283	
Yarmouth.....	109	243	1,409 05	14	852	61	276	2,770 20	123	
Total.....	5,632	9,265	55,202 15	402	13,237	33	3,558	38,052 30	6,034	2
Charlotte.....	368	631	3,743 75	4	57	14	10	126 50	372	
Gloucester.....	151	367	2,114 00	198	2,921	15	827	8,668 80	349	
Kent.....	88	184	1,072 40	7	71	10	19	203 05	95	2
Northumberland.....	2	6	34 10	1	21	21	5	55 75	3	
Restigouche.....	3	7	40 45						3	
St. John.....	22	36	214 60	1	17	17	3	37 85	23	
Total.....	634	1,231	7,219 30	211	3,087	15	864	9,091 95	845	2
Kings.....	349	484	2,938 10	2	31	15	4	58 80	351	
Prince.....	285	553	3,269 95	5	63	12	12	146 40	290	
Queens.....	97	218	1,263 25	1	14	14	2	27 90	98	
Total.....	731	1,260	7,471 30	8	108	13	18	233 10	739	
Bonaventure.....	309	569	3,352 15	2	22	11	5	56 75	311	
Gaspé.....	2,483	4,829	28,306 50	1	10	10	5	44 75	2,484	1
Matane.....	119	182	1,094 35						119	
Rimouski.....	1	1	0 30						1	
Saguenay.....	671	1,190	7,041 65						671	
Total.....	3,583	6,771	39,800 95	3	32	11	10	101 50	3,586	1
Grand Total.....	10,580	18,527	109,693 70	624	16,464	26	4,450	47,478 85	11,204	5

## FISH CULTURE

The fish cultural operations of the department during the calendar year 1922 embraced the more important fresh water and anadromous food fishes, such as Atlantic salmon in the east, whitefish, salmon trout and pickerel in the interior, and the Pacific salmon in the west.

A portion of the whitefish and pickerel eggs and practically all the salmon trout eggs were obtained from the commercial catch, and the department is, therefore, largely dependent upon the co-operation and the success of the fishermen for such eggs. The bulk of the salmon trout are caught in gill-nets that are ordinarily lifted every twenty-four hours, but during cold and stormy weather are often not lifted for much longer periods. It is therefore not surprising that the eggs obtained from such sources are not of the best quality, but all that are saved by the hatcheries are that much direct gain to the fishery, as they would otherwise be totally destroyed.

The commercial species of the interior were distributed in a free-swimming stage after the food sac was absorbed, on the natural spawning grounds of the larger lakes. The bulk of the salmon in the eastern and in the western provinces was also distributed as fry after the food sac was absorbed, but a larger number than ever before was retained and fed in ponds and enclosures, and liberated in the advanced fry and fingerling stages. The sporting varieties of trout were handled in limited numbers, and, after adequate return was made to the waters in which such eggs were collected, the most of the balance was distributed in public waters, largely in response to applications. Small allotments were made to privately controlled or leased areas on the payment of nominal prices and transportation expenses.

The total distribution of all species was over thirty-three million larger than the distribution of last year and over one hundred and twenty-eight and a half million larger than the distribution of 1920. Several lakes and streams in British Columbia and the Prairie Provinces that are not readily accessible from hatcheries received allotments of fish caught in and transferred from other waters.

## COLLECTION OF EGGS

Atlantic salmon were more plentiful than they have been for years in all the rivers of the Maritime Provinces where hatchery operations were carried on and the full supply of such eggs was readily obtained. This collection could have been increased without difficulty had it been desired. The capture of four hundred and sixty-five salmon on September 23 and of four hundred and fifty on September 28 in the two nets that were operated for hatchery purposes in the Miramichi river is some indication of the present condition of this stream.

All previous collections of whitefish eggs were exceeded in the bay of Quinte and in Georgian bay. The collection in lake Winnipegosis was larger than it has been for several years and was only half a million smaller than the best since the hatchery was established in 1909. There was a small increase in the lake of the Woods and a decrease in lake Winnipeg.

There was a small increase in the total collection of pickerel, which was largely due to a change in methods at the Sarnia hatchery. The collection at this point was increased to eighty-one million from twelve million in 1921.

In recent years conditions have been against a large collection from the commercial nets in the neighbourhood of Point Edward, lake Huron. The run of fish during the early spring and before the spawning period has been satisfactory, but comparatively few were taken during the spawning season in a

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ripe condition. The unripe fish that were retained in the pound-nets did not develop satisfactorily on account of the low temperature of the water, although efforts were made in 1921 to retain some of the early fish in enclosures close to the nets. This season a portion of the catch of three fishermen was transferred from the nets, a distance of from six to nine miles and retained in pound-net pots in the warmer water of Sarnia bay. The water here was at times as much as ten degrees warmer than it was in the lake where the fish were caught. The higher temperature had the desired results and the fish ripened very quickly. The loss in the retainers was practically nil and the eggs throughout were of high quality. On account of the loss in weight through stripping, the fishermen were paid fifteen cents each for the handling of the fish, which were returned to them after they were stripped. Had this method not been followed, these eggs—fifty-seven million—would have been a total loss so far as reproduction was concerned, as the fish would not ripen in the nets and would have been placed on the market. Under the conditions that have obtained in recent years, not more than four to five per cent of the commercial catch has been ripe when caught.

The collection in the lake of the Woods for the Kenora hatchery has each year since its inception, with the single exception of 1920, been larger than those of all preceding years. This gratifying condition continued during the current season and the collection was over ten million larger than the record collection of 1921.

The establishment of the provincial hatchery at Sault Ste. Marie necessitated a reallocation of the collection areas in lake Huron and Georgian bay previously covered by this department's hatcheries. This reallocation was made on a geographic basis.

Weather conditions generally were more favourable than usual, and although the total collecting area was considerably smaller the total collection of salmon trout eggs from lake Huron and Georgian bay was larger than it was in 1921 and the quality of the eggs was better. In the westerly portion of lake Superior, where the Port Arthur hatchery procures its supply of eggs, the majority of the nets were put out of commission about the middle of October, and owing to continuous unfavourable weather were pulled out towards the end of the month. The collection was consequently not as large as it was last year and owing to the conditions that obtained when they were taken a considerable portion of the eggs was not up to the usual standard. The total collection of such eggs was, however, slightly larger than it was last year.

The total collections of sockeye eggs and of the eggs of all species of Pacific salmon were respectively over three and two million greater than last year and the collection of sockeye eggs in the Fraser River watershed was nearly seventy per cent greater than it was in the preceding cycle year 1918. The run of this species to the Pitt Lake river was at least twenty-five per cent greater than in any year since the hatchery was built in 1917. The run to Cultus lake compared favourably with that of the cycle year 1918, and was about the same as last year. Conditions were greatly improved on the Harrison lake area, where over two million eggs were obtained as compared with seven hundred thousand last year. Morris creek alone produced over one million eggs as against sixty-five thousand last year. The run to the Birkenhead river was heavier than that of last season and almost as good as the banner year 1920. Twenty-six million eggs were collected and not more than twenty-five per cent of the fish available were handled. All the spawning grounds of this area were heavily seeded and in view of this twelve million eyed eggs were transferred from the Pemberton hatchery to other districts above Hell's gate on the Fraser

River watershed, where conditions were not so favourable. These transfers were as follows:—

Stuart Lake hatchery—for the seeding of the Upper Fraser river.....	4,000,000
Cultus Lake hatchery—for the seeding of Eagle river, Shuswap Lake system.....	4,000,000
Harrison Lake hatchery—for the seeding of Morris creek and other streams tributary to Harrison lake.....	2,000,000
Horsefly river—tributary to Quesnel lake.....	2,000,000

The run of sockeye to Owikano lake, Rivers inlet, was similar to that of last year, inasmuch as the streams at the head of the lake that have been disregarded so far as the collection of eggs and the distribution of fry are concerned and have been left to natural propagation, were failures, but those at the lower end of the lake carried good runs and the collection in Quap could readily have been doubled. The run to the district as a whole was fair but unfortunately the severe freshets which scoured many of the creeks did serious damage to the natural seeding. The necessary additions have been made to the hatchery equipment and all the suitable streams tributary to the lake are now being stocked with eyed eggs or fry.

The whole of the Babine lake area was better seeded than last year—although last year was well up to the average—and as well, if not better, seeded than it was in 1918. Pierre creek carried probably twice as many salmon as last year; Fulton river was fairly well seeded; Fifteen Mile, Four Mile and Grizzly creeks and Beaver river were abundantly seeded, and Babine river was well up to the average of all good years.

The conditions in the hatchery creek again demonstrated the value of past operations. The fish were so plentiful that after a collection of eight million one hundred thousand eggs was made there were more in sight than had been handled by the hatchery staff.

The Bulkley river area carried a good run, which was as good, if not better, than that of 1918.

The run of sockeye to the Kitsumgallum area was better than it was last year, and was at least equal to that of 1918. The eggs, however, in 1918 were undisturbed by freshets, while this season heavy rains occurred, and the creeks were flooded which, no doubt, caused some loss.

The aggregate run of salmon to the Lakelse lake district in 1922 was heavy, particularly the sockeye and pinks. The run of spring salmon was only up to the average of recent years. The run of coho was fair and the run of chums small.

The sockeye came in two runs, the second one being very heavy and as late as October, large schools were lying off the mouths of Salmon and Williams creeks. Schallabuchan creek was poorly stocked, but the runs to Granite, Salmon and Williams creeks more than made up for this.

Towards the end of November the severest freshet since 1917 occurred. The upper spawning beds of all creeks were badly scoured and the damage to the natural seeding must have been excessive. The freshets also brought down a large amount of fine glacial silt which sifted into the gravel and buried the lower spawning beds which were not so greatly damaged by scouring.

A great improvement in the sockeye run over that of last year, and also over the cycle year of 1918 was in evidence in Kennedy lake.

After approximately seventy-five thousand sockeye salmon had been captured and canned by the Clayoquot Sound cannery, a plentiful supply reached the spawning grounds. The majority of these were apparently beach spawners and only a small proportion proceeded to the spawning areas in tributary streams. In this connection it is interesting to note that in the past the distribution of the fry was largely confined to the beaches of the lake in the vicinity of the hatchery, and the returning parent fish now frequent those

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beaches; whilst at other points which have not received the assistance of artificial methods, but where the conditions appear to be in every way favourable for the natural propagation of salmon, poor returns of parent fish were noted. The distribution either with eyed eggs or fry is now being made to all suitable and accessible places in Kennedy lake and its tributaries.

Over nine million sockeye eggs were taken without difficulty, and sufficient parent fish were left to adequately seed the spawning area. The cannery which draws very largely from this area put up five thousand five hundred cases sockeye, which is the second largest pack in its history.

The lake was favourably low during the spawning season, and the loss that is sometimes due to the water receding after the eggs are deposited should be small. Reference was made last year to the probable loss in salmon eggs that in 1921 were deposited along the gravel bars and beaches of Kennedy lake that usually go dry during the low water. No freshets occurred in this district during the following winter, and on April 29 the water was still low. Examination of the beaches showed a heavy loss in eggs, and a much heavier loss in fry after they had hatched on account of the low stage of water. From an examination of these beaches and gravel bars the superintendent of the hatchery estimates that less than one per cent of the fry resulting from last season's naturally spawned eggs reached the open water.

The superintendent of the Anderson Lake hatchery estimates that at least one hundred and twenty-five thousand sockeye reached the spawning grounds of Anderson lake this year as compared with ninety thousand last year. The run of coho was fairly good, being twenty-five per cent greater than last season. A few spring and chum spawned in the outlet of the lake. The natural spawning beds were overcrowded and immense numbers of the early eggs were destroyed by being disturbed and dug up by later spawning fish. Climatic conditions were favourable as no severe freshets occurred to scour the creeks and the water remained at a low level during the spawning season, so that few eggs will be left exposed through further lowering of the water. As the spawning beds were overseeded, a portion of the eggs taken for the hatchery will be transferred when eyed, and planted under suitable conditions in streams tributary to Great Central and Sproat lakes.

There was a good run of spring and a heavy run of coho in the Cowichan Lake district and until December 13 climatic conditions were favourable as the heavy freshets that did so much damage last year did not recur. While more spring salmon were caught the collection of such eggs was smaller than last year as these fish were so green and hard that most of them would not develop their eggs satisfactorily in confinement and had to be liberated. The Superintendent of the hatchery suggests that this earlier arrival at the hatchery nets and harder condition of the fish was due to the removal of obstructions at Skutz falls on the Cowichan river. Previously these obstructions kept the fish from ascending during low water but since their removal there is nothing to prevent their ascent. The same unripe condition was found in the coho but these fish were so plentiful that no difficulty was experienced in getting all the eggs required.

The total collection of eggs of the different species made during 1922 was as follows:—

Atlantic salmon.....	29,397,200
Cutthroat trout.....	660,380
Steelhead salmon.....	99,400
Kamloops trout.....	965,200
Sockeye salmon.....	83,307,835
Spring salmon.....	2,647,360
Albino spring salmon.....	156
Coho salmon.....	1,848,700
Chum salmon.....	3,086,670
Speckled trout.....	552,827
Whitefish.....	599,260,000
Salmon trout.....	42,737,000
Cisco.....	3,500,000
Pickarel.....	234,009,330
	<hr/> 1,002,072,058

In addition to the eggs collected, one hundred thousand landlocked salmon eggs, two hundred and ninety-three thousand rainbow trout eggs, three hundred thousand cutthroat trout eggs and two hundred thousand speckled trout eggs were received from the Federal and State departments of the United States in exchange for atlantic salmon eggs and one hundred thousand brown trout eggs in exchange for speckled trout eggs.

Under an arrangement made with the Department of Game and Fisheries, concurred in by this department, the officers of the United States Federal hatchery at Cape Vincent, N.Y., collected whitefish eggs in Canadian waters on the Ontario side of the boundary line. This department is indebted to the United States Bureau of Fisheries for a present of 14,000,000 whitefish eggs from the surplus collection at the Cape Vincent hatchery. These eggs were laid down in the Kingsville hatchery. It is also indebted to the Department of Game and Fisheries, Toronto, for 13,120,000 whitefish eggs—7,855,000 were laid down in the Port Arthur hatchery and 5,265,000 in the Kingsville hatchery—and 15,000,000 pickarel eggs that it collected in Hay bay, bay of Quinte. These eggs were placed in the Thurlow hatchery and a portion of the resulting fry were placed at the disposal of the Provincial department for stocking waters that are not as readily accessible from its own hatcheries.

A surplus collection of 1,498,000 salmon trout eggs, included in the above statement, from this department's hatchery at Wiarton was turned over to the Quebec Provincial Government.

#### REARING OF FINGERLINGS

The facilities for feeding fry were enlarged or improved at various salmon hatcheries and the output of advanced fry and fingerlings was greater than ever before. The expansion in this direction at the hatcheries now operated by this department is indicated by the following figures:—

Year	Output
1922.....	28,670,900
1921.....	22,253,000
1920.....	8,539,100

The supplying of the more isolated hatcheries—where cold storage facilities are not available and the means of transportation do not permit of fresh food being brought in from outside points, where it can be procured—is not always an easy matter. Cheap grades of canned salmon and canned whale meat and fishotein are kept in stock and these preserved foods are supplemented by fresh coarse fish caught by the hatchery staffs. The superintendent of the Cultus Lake hatchery has developed several of the smaller creeks that flow into the lake as natural retaining ponds or protected areas in which the fry are retained, without crowding, under practically natural conditions, and allowed to escape to the lake as their growth and consumption of food demand.

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The results that follow the distribution of eyed eggs and fry in lakes devoid of fish life and in which plankton and other natural fry food is abundant was again fully demonstrated. Such lakes or natural retaining ponds are not numerous, but wherever found are being utilized to the fullest extent. In several instances sockeye distributed in these lakes have in three months attained the size of the average Fraser river fish when twelve months old.

There are numerous salmon waters, particularly in British Columbia which are inaccessible from existing hatcheries, so far as stocking them with fry is concerned. These waters have consequently not been stocked and many of them have become depleted. The surplus eggs that are available in the more productive areas are now, after they are eyed in the hatcheries, being utilized to seed these areas. These eggs are planted in selected places in the gravel of what are known to have been at one time the principal spawning grounds. This work was taken up in a systematic way in British Columbia in 1921, and last summer the most encouraging reports were received from all areas that were so seeded. Immense numbers of fry and fingerlings were seen in waters in which it was known that very few, if any, parent fish had spawned. Several of what were at one time the principal spawning grounds of the Stuart Lake system, the Quesnel Lake system, the Seton-Anderson Lake system and the Shuswap Lakes system—all above Hell's gate on the Fraser—were seeded with eyed eggs from the Pemberton hatchery which is below Hell's gate. Great Central and Sproat lakes, Vancouver island, and several smaller lakes on the west coast were similarly and respectively seeded from the Anderson and Rivers Inlet hatcheries, as were other waters nearer the other establishments.

## ACCLIMATIZATION

Gratifying results are in evidence from the efforts to establish some of the more important food and sport fish in waters to which they are not indigenous. Eastern whitefish in various stages of growth up to four and one-half pounds in weight have been taken in British Columbia lakes; several spring salmon of the Pacific, some of them weighing twenty pounds, were caught in lake Ontario; Atlantic salmon of various sizes from fingerlings to fresh-run fish in prime condition and kelt, on their return to sea after spawning, have been caught in the Cowichan river, British Columbia; black bass are firmly established in Christina lake in southern British Columbia, and several lakes in Vancouver island. Eastern speckled trout are also found in southern British Columbia, and fingerling rainbow trout were this season quite numerous in several of the foothill streams of Alberta in which they were last year distributed from the Banff hatchery.

## MARKING OF FISH

The marking of fingerling and adult salmon was continued in the eastern and western provinces for the purpose of gaining some definite information with regard to the life history of these fish. Thirty kelt caught on their seaward migration, and five hundred and twenty-three adult Atlantic salmon were marked and liberated—the latter after they were stripped at the various retaining ponds—in the Maritime Provinces. The mark used was a numbered silver tag, attached to the dorsal fin. Over one hundred thousand fingerling salmon were marked and liberated at the different hatcheries in the east and in the west principally by the removal of the adipose fin. It is hoped that the recaptures of these marked fish will throw some light on the life history of the species.

The desirability of thorough scientific investigation into all matters that affect the reproduction of fish has been receiving attention, and at the beginning of last year the question of investigation into the life-history of the salmon,

spawning ground conditions, and other related matters, as they affect the Fraser river, was referred to the Biological Board.

The question of the ownership and administration of the fisheries of the province of Quebec—which has been the subject of considerable negotiation and some litigation—was settled by agreement of the Dominion and Provincial Governments. The Provincial Government took over from June 30, 1922, the administration and protection of all the fisheries of the province—with the exception of those about the Magdalen Islands—including the administration of the hatcheries. Under this agreement, the Tadoussac and Gaspé main hatcheries, the Bergeronnes, Ste. Marguerite and Dartmouth, sub-hatcheries, and the Tadoussac and York salmon retaining ponds, with all their equipment, were transferred to the province and are now administered by the Department of Colonization, Mines and Fisheries, Quebec.

At the present time this department is operating thirty-two main hatcheries, seven sub-hatcheries, five salmon retaining ponds, and several egg-collecting and one eyeing station. The distribution of eggs and fish by species during 1922 was as follows:—

Nova Scotia—		
Atlantic salmon.....	9,821,435	
Speckled trout.....	617,996	
		10,439,431
New Brunswick—		
Atlantic salmon.....	10,825,156	
Ouananiche.....	3,650	
Landlocked salmon.....	65,128	
Rainbow trout.....	58,024	
Spring salmon.....	197	
Speckled trout.....	193,950	
Brown trout.....	63,043	
		11,209,148
Prince Edward Island—		
Atlantic salmon.....	1,482,300	
Speckled trout.....	177,028	
		1,659,328
Quebec—		
Atlantic salmon.....	2,914,633	
Speckled trout.....	68,220	
		2,982,853
Ontario—		
Spring salmon.....	194,470	
Whitefish.....	323,143,000	
Salmon trout.....	24,211,290	
Cisco.....	3,000	
Pickarel.....	165,797,330	
		513,349,090
Manitoba—		
Whitefish.....	206,173,750	
Pickarel.....	10,678,000	
		216,851,750
Saskatchewan—		
Whitefish.....	30,000,000	
		30,000,000
Alberta—		
Atlantic salmon.....	266,177	
Rainbow trout.....	307,600	
Cutthroat trout.....	393,505	
Salmon trout.....	175,935	
		1,143,217
British Columbia—		
Atlantic salmon.....	382,839	
Cutthroat trout.....	213,391	
Steelhead salmon.....	90,038	
Kamloops trout.....	899,343	
Sockeye salmon.....	73,329,557	
Albino spring salmon.....	75	
Spring salmon.....	1,856,930	
Coho salmon.....	1,235,000	
Pink salmon.....	3,878,800	
Speckled trout.....	3,303	
Whitefish.....	9,463,000	
		91,352,276
Total distribution.....		878,987,093

## BIOLOGICAL STATIONS IN CANADA

The Marine Biological Board has two stations at which research work is carried on, one on the Atlantic coast at St. Andrews, N.B., and the other on the Pacific coast at Departure Bay, near Nanaimo, B.C. The two stations are equipped with research tables, fresh and salt water taps, chemical reagents, glassware, and a complete outfit of nets, dredges, etc., for deep-sea and inshore investigations.

Gasolene launches and small boats with the necessary crews are at the service of the workers. Each station has a library of representative scientific workers.

The laboratories and residences are open from June until September. The work of the stations each season includes fishery investigations, life-history, growth and food of fishes, faunistic work, biochemical, bacteriological and hydrographic researches, including physical and chemical studies of sea-waters.

The scientific staff for each season consists of several classes of workers.

1. Senior workers who are members of the Biological Board and professors from different Canadian universities.

2. Qualified investigators recommended from various universities.

3. Qualified investigators who desire to undertake any research which has only a very indirect economic bearing.

4. Members of the Biological staff of any Canadian university who desire to collect material.

Apart from evening lectures, the investigators who deal with their own special subject of research, no teaching is done. The directors, however, are ready to give as far as they can, such advice or aid as may be required by beginners.

During the year 1922 the following scientific investigators carried on research as indicated below:—

## ATLANTIC STATION, ST. ANDREWS, N.B.

Nineteen scientists conducted investigations at the Atlantic Station:—

Professor L. W. Bailey: Diatoms.

Professor C. C. Benson, University of Toronto: The Chemistry of fish muscle

Mr. S. W. Britton, McGill University: The temperature-reactions of fishes.

Professor C. J. Connolly, St. Francis Xavier's College: The larvæ of decapods.

Mr. H. S. Coulthard, University of Toronto: The growth of the mussel.

Dr. E. C. Hood, Macdonald College: The bacteriology of fish in cold storage.

Professor A. G. Huntsman: The factors influencing the growth and distribution of marine animals.

Dr. F. S. Jackson, McGill University: The histology of the pancreas of fishes.

Professor A. B. Klugh, Queen's University: The culture of the ostracods and copepods of freshwater pools.

Professor A. P. Knight: Problems in lobster canning.

Mr. A. H. Leim, University of Toronto: The effect of varying temperature, salinity and acidity on calanus.

Mr. J. Murray Luck, University of Toronto: The effects of various salts on metabolism in bacteria.

Professor J. J. R. Macleod, University of Toronto: The occurrence of insulin in fishes.

Mr. Neil McLeod, Jr., McGill University: The life history of the freshwater smelt.

Mr. D. J. MacLeod, Queen's University: Assisting Professor Reed.

Dr. Louis Pare, Montreal, Que.: The bacteriology of canned lobster.

Professor G. B. Reed, Queen's University: The bacteriology of canned lobster.

Miss E. M. Taylor, University of Toronto: The factors determining successful development in certain marine animals.

Miss Margaret Wilton, Queen's University: Assisting Prof. Klugh.

The weekly and monthly collections of plankton and hydrographic material at established points in the Passamaquoddy region have been continued, and daily records of the temperature of water and air at St. Andrews have been taken for more than two years, and are being continued. The study of the success of the spawning of the smelt in the Passamaquoddy region have been continued.

*Field Investigations.*—In place of the usual intensive investigation of a particular region, the work of the *Prince* for the summer season was the following up of the spawning of the mackerel along the outer coast of Nova Scotia. The village of Hubbards, situated on St. Margaret's bay, served as the base for this work. The parish hall was obtained for a laboratory. Professor Philip Cox, of the University of New Brunswick, was engaged at the laboratory in studying the order in the appearance of the mackerel along the coast, and in identifying the fishes obtained. Mr. M. I. Sparks, of the University of Toronto, examined the plankton catches for mackerel eggs and larvæ.

Professor Knight continued, during the latter part of the season at Summerside, P.E.I., his investigations on the natural history of the lobster and on lobster canning.

Professor A. D. Robertson, Western University, London, Ont., continued his studies of the oyster, with headquarters near Bedford, P.E.I. In this work he was assisted by Miss Kathleen Braithwaite, Mr. Claude McCallum and Mrs. Robertson.

Mr. A. H. Leim, of the University of Toronto, studied the life-history of the shad on the Shubenacadie river and Scotsman bay, N.S. Through the International Committee on Deep-Sea Fisheries Investigations co-operation was secured with Newfoundland and the United States in an extensive plan for determining the currents along the Atlantic coast; 1,736 drift bottles have been sent out by the station. Series of bottles were put out as follows: From St. John's eastward across the Grand Bank, through the courtesy of the Newfoundland Government; across Cabot strait by Mr. G. F. Sleggs, of Dalhousie University; from Canso across the continental shelf by C.G.S. *Arras*; and from near Cape Sable across the continental shelf by the Biological Boat *Prince*.

The Department of Marine and Fisheries gave the use of the C.G.S. *Arleux* from July 18 to 21 for conveying Dr. Huntsman and Miss Taylor from the station to St. Mary bay and back for the purpose of procuring living eggs of the cunner for experimental work.

Mr. D. A. MacKay, Ottawa Collegiate Institute, during the month of August explored St. Mary bay, N.S. to determine the presence and the habits of the very young lobsters.

Mr. Harkness, University of Toronto, arranged to carry on some studies, in accordance with Professor W. A. Clemen's plan of work, on Sturgeon Spawning and Experimental Sturgeon Culture of the Great Lakes.

During the week of September 20, Professor Knight and Professor Huntsman gave a number of lectures and demonstrations in the course of instruction for fishery officers at the conference held at Shediac, N.B.

Professor Knight during the season of 1922 continued his bacteriological investigations in and around lobster canneries with a view to improving the quality of the pack. His report on "Sanitation in Lobster Canneries" which

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was duly published and distributed amongst the canners, is calculated to bring about great and needed improvements in the equipment of the canneries and the methods of packing.

Professor Knight attended the meeting of the Packers' Branch of the Canadian Manufacturers' Association at Moncton, N.B., at the end of November, and laid before it a plan for the grading of lobster canneries, which with modifications was adopted.

## PACIFIC STATION, DEPARTURE BAY, NANAIMO, B.C.

Professor C. McLean Fraser, University of British Columbia: Continued fishery investigations, salmon, halibut, herring, etc., also conjointing with International (U.S.) Committee researches on pile-borers and shipworms, faunistic studies, etc.

Mr. Cyril Berkeley: Biochemical studies on fish and their sea-water environment; bacterial studies.

Miss Mounce, University of Manitoba: Faunistic studies and preparation of biological material for researches.

Mr. H. A. Dunlop, University of British Columbia: Investigations at Harrison Lake hatchery, and spawning grounds into the biology of the sockeye and other Fraser river salmon.

Mr. G. Foerster, University of British Columbia: Fraser river sockeye investigations on Harrison lake and Lower Fraser.

## NATURAL HISTORY OBSERVATIONS

During the summer and fall of 1922 the department's naturalist carried on observations as to the condition of lobsters during the month of June in Neguac bay, N.B., and adjacent waters. He was investigating the condition of the scallop fishery in Mahone bay, N.S., during the month of June. Investigations into the condition of the lobster were also made by him in the strait of Northumberland by the River Philip channel, N.S., Chock Fish river, N.B., before and during the open season last fall.

The naturalist also talked to the fishermen on the nature history and conservation of the lobster at localities on the strait of Northumberland and St. George's bay. These talks were made more interesting by the use of lantern slides.

## INTERNATIONAL COMMITTEE ON DEEP SEA FISHERIES INVESTIGATIONS

This committee was formed in 1921 by the Governments of Canada, the United States, and Newfoundland, in order to form a permanent means of co-operation between these countries in investigations connected with the offshore fisheries, both those that are in progress and also those that may be undertaken in the future.

During 1922 the Canadian personnel of the committee has been changed by the appointment of Professor J. Playfair McMurrich, vice Mr. Loring C. Christie, who resigned. Two meetings were held during the year, one at Montreal on May 26, and one at Washington on November 10. In order to make better provision for continuity in the work of the committee, Dr. Huntsman of Canada was appointed permanent secretary at the May meeting, and Dr. Moore, of the United States, permanent chairman, at the November meeting.

Among the subjects, in which co-operation between the three countries has been or is being arranged, may be mentioned the following: Improvement in

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the collection of statistics of the off-shore fisheries; the investigation of currents by means of drift bottles; and investigation of the life histories of the cod and haddock.

The interest of France, with her colonies, St. Pierre and Miquelon, in the cod-fishery of the Grand Banks has brought forward the matter of her being represented on the committee, and it is expected that she will have such representation in the near future.

In closing I regret to have again to report a loss of life, due to the prosecution of our fisheries. There were fourteen casualties on the Atlantic and one on the Pacific during the year 1922.

I am, sir, very respectfully,  
Your obedient servant,

A. JOHNSTON,  
*Deputy Minister of Marine and Fisheries.*

## APPENDIX I.

## REPORTS OF CHIEF INSPECTORS OF FISHERIES

REPORT OF CHIEF INSPECTOR WARD FISHER, ATLANTIC  
FISHERIES DIVISION, FOR 1922

The operations for the year show a gratifying improvement over 1921, notwithstanding the unfavourable weather conditions the first three months prevented any general activity by the inshore fishermen. With the exception of the summer months the demand for fresh fish was heavy, and the dealers had difficulty in filling orders during the fall and winter months. The steam trawlers afforded the only regular supplies for the markets. If it had not been for the landings of these vessels, the fresh fish market, which has been expanding the past few years, would have been jeopardized.

For several years the prices for the landings by the netsmen and handliners were small, and there was little, if any, improvement during 1922. The unfavourable conditions in this respect were very greatly aggravated by the American tariff, resulting in the general discontent of the fishermen, as the buyers were unable to meet the duties on the exports to the United States, and sustained or increased the prices to the fishermen. The industry in this respect became fairly stabilized by the end of the year, as the effect of the tariff became established.

The outlook for 1923 is not very promising, and unless the conditions greatly improve, the restricted markets will seriously affect the industry. It is to be regretted that a very considerable number of our fishing population have either taken up other occupations or have left the country for the United States. It will be difficult, if not impossible, for some years to replace them, and their loss to the industry is to be deplored.

It will be interesting to note that while the total value of the fisheries show a decrease as compared with the banner years of the Great War period, there is a fair increase as compared with the opening year of the war. While the shrinkages in value accompanying the return to normalcy has led to some misgivings in connection with the development of the fisheries, as a matter of fact there has been a gratifying normal increase as compared with the year immediately preceding the war. It should be particularly borne in mind that during the past four years the export trade has been so demoralized that large and valuable markets have been practically closed to our dealers.

The statistics given in this report will be subject to some slight corrections, as the snow blockades which prevailed throughout the Maritime district prevented the prompt collection and preparation of the final reports.

The total number of fishing licenses issued was 22,644, divided among the districts as follows:—

Nova Scotia.....	11,253
New Brunswick.....	8,015
Prince Edward Island.....	2,893
Magdalen Islands.....	483

The following is a resume of the operations by provinces and districts:—

## NOVA SCOTIA

The total landed value was \$7,443,746 as compared with \$7,018,076 the previous year. The marketed value of the cured and prepared product was \$10,209,258.

*District No. 1, Cape Breton—Inspector McLeod.*

The total landed value was \$935,457 as compared with \$767,435 in 1921, or an increase in value of \$168,022. The marketed value was \$1,537,004 or a decrease of \$41,046 from 1921.

Operations were carried on under most unfavourable conditions as the drift ice remained unusually late on the coast, greatly hampering the cod, haddock and lobster fishermen. The dark, rainy weather that prevailed during the summer season made impossible the proper drying of the fish, with the result that a large percentage of it was sold at prices that did not meet the expense of curing. The boisterous fall weather interefered with the mackerel fishing operations at Grand Etang, Margaree harbour and Eastern harbour, Inverness county, during the months of September and October, and practically prevented any fishing at Ingonish and Neil's harbour, Victoria county, in December and January—the period during which largest catches of cod and haddock were formerly landed. The prices for the principal catches were so low that the fishermen ceased operations early in the season.

The lobster fishery was particularly encouraging, the catch being 47,898 cwt., having a value of \$363,078, as compared with 36,215 cwt., and \$160,410 in 1921. The fish were plentiful during the brief period the fishermen were able to operate. The bulk of the catch was made the first three weeks of the season, except off the coast of isle Madame, Richmond county, where few were taken until the last two weeks. The largest catches were landed at Port Hood island, Grand Etang and Mabou Mines. The pack was as follows:—

County	Catch	Value	Pack	Value
		\$		\$
Richmond.....	5,665	45,294	2,190	61,744
Cape Breton.....	16,615	113,894	7,361	222,659
Victoria.....	8,419	66,298	4,147	124,350
Inverness.....	17,199	137,592	8,202	264,694
	47,898	363,078	21,900	673,452

The cod and haddock catch was 207,746 cwt., having a value of \$264,085, as compared with 241,860 cwt., and \$318,555 in 1921. The decrease in the catch was 34,114 cwt. and \$54,470 in value.

The mackerel catch was 38,372 cwt., having a value of \$154,551, as compared with 28,832 cwt., and \$134,363 in 1921. It should be noted that while there was an increase of 9,540 cwt. in the catch and \$20,188 in value, there was a decrease in the marketed value of \$25,860 due to the unusually heavy run of summer fish along the southern coast of Cape Breton county and the northern coast of Victoria county. These catches were so poorly cured that there was small demand, at low prices. Indeed, a portion of the catch had to be dumped after curing.

The herring catch was 26,132 cwt., having a value of \$26,028 or an increase of 3,801 cwt. and \$5,408 in value, as compared with the preceeding year. There was, however, a great decrease in the marketed value of the pickled product. In 1921 the marketed value was \$90,226 as compared with \$45,244 for the past year. The increase in the catch was due to the heavy run of spring herring, and the decrease in the marketed value to the failure of the July run on the south coast, which is usually disposed of at about \$10 per barrel.

The catch of swordfish was 5,955 cwt., having a value of \$42,569 as compared with 4,160 cwt. and \$41,139 in 1921.

The salmon catch was 2,153 cwt., having a value of \$24,017 as compared with 1,781 cwt. and \$21,466 in 1921.

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*District No. 2*—Comprising Halifax county and the counties of Guysboro, Antigonish, Pictou, Colchester, Cumberland and Hants—Inspector Sutherland.

Total catch, 570,517 cwt., having a landed value of \$1,752,906, as compared with 1921 there was an increase in the catch of 61,279 cwt. and \$421,485 in value. The marketed value was \$3,081,463.

Favourable conditions were not general in this district.

While the portion of the district along the Northumberland straits, where lobster fishing is principally carried on, had a very successful year, with a large increase in catch and pack, Halifax and Guysboro counties, which support the largest number of fishermen, did not share very largely in this prosperity. The spring mackerel fishery was a success in these counties but the results were offset by lower prices and the failure of the fall mackerel fishery, owing to the fish keeping offshore. These conditions, combined with exceptionally low prices for cured fish, particularly pickled herring and mackerel, did not tend to make 1922 a success from the fishermen's point of view.

The outstanding feature of the year's operations was the lobster fishery of the Northumberland coast, and the increased mackerel and haddock catches on the Atlantic coast. Only in Halifax county west, and Guysboro county east could the lobster fishery be called a failure. Late drift-ice interfered with the fishery in Guysboro county.

The lobster catch was 63,709 cwt., having a value of \$494,061, as compared with 48,428 cwt., and \$243,057 in 1921. Along the Northumberland straits ideal weather conditions prevailed during the fishing season. In Antigonish county drift-ice prevented operations until early in May. During the year seventy-three lobster canneries operated and 28,763 cases were packed. The pack shows an increase of 7,891 cases over that of 1921. Prices to the fishermen opened at \$6 per cwt. and gradually increased until \$13 was paid in some sections toward the end of the season. The average price, however, was about \$7 per cwt. The pack was as follows:—

	Catch	Value	Pack	Value
		\$		\$
Halifax.....	6,500	66,966	1,446	44,640
Guysboro.....	9,770	76,678	3,345	113,878
Antigonish.....	10,309	83,373	5,176	152,992
Pictou.....	21,390	153,048	11,009	335,935
Colchester.....	60	420	25	790
Cumberland.....	15,590	113,576	7,787	235,574
	63,709	494,061	28,763	883,019

The cod catch was 180,403 cwt., having a value of \$326,869, as compared with 177,782 and \$287,075 the preceding year; or an increase of 2,621 cwts. and \$39,794. The catches were chiefly in Halifax and Guysboro counties, the largest catches being landed at Catch Harbour, Sambro, Terrence Bay, West Dover, Indian Harbour, Tangier, Jeddore, Canso, Liscomb, Drumhead, Mulgrave, Queensport and Whitehead.

The haddock catch was 121,950 cwt., having a value of \$234,668, as compared with 105,113 cwt. and \$208,045 the preceding year; showing an increased catch of 16,837 cwt. and \$26,623 in value. Forty per cent of the catch was taken offshore by steam trawlers landing at Halifax and Canso.

The mackerel catch was 75,095 cwt., having a value of \$342,624, as compared with 33,874 cwt. and \$222,523 the preceding year; showing an increase of 41,221 cwt., and \$120,101 in value.

The outstanding increase was in Halifax West, where 43,295 cwt. were landed. The increase was quite general, but was of the spring run chiefly. It is interesting to note that the catch was the largest for the past ten years.

The herring catch was 68,494 cwt., having a value of \$67,296, as compared with 90,957 cwt., and \$102,639 in 1921; or a decrease of 22,463 cwt. and \$35,343 in value. This decrease was due to small catches in Guysboro county from New Harbour to the Halifax county line. In Cumberland county there was an increase of about 3,000 cwt. The demand for fresh herring was poor, and prices for salt herring very low, consequently there was no great incentive to prosecute this fishery. The best price secured for pickled herring was \$4.50 per barrel, and toward the end of the year dropped to \$3.50. As barrels cost \$1.50 each it will readily be seen that the fishermen had little or no profit, to pay for salt, labour and transportation. Owing to these conditions hundreds of barrels were thrown back into the sea by the fishermen in Halifax county, and are not included in the catch. About 7,000 cwts. were smoked in Cumberland county.

The salmon catch was 4,587 cwt., having a value of \$58,605 as compared with 3,192 cwt., and \$54,028 in 1921; showing an increase of 1,395 cwt., or 44 per cent. Lower prices, however, prevailed than in 1921. Increased catches were made in Pictou county west, Antigonish and Halifax county west. In the first two counties the catch was nearly double that of 1921. For the whole district the catch has increased 167 per cent since 1920. The past year's catch compares favourably with the best catches the past ten years.

The shad catch was 485 cwt., having a value of \$6,487, as compared with 107 cwt. and \$1,845 in 1921. This fishery, which is confined to the headwaters of the Bay of Fundy, shows a fairly satisfactory recovery since the close season of 1918, and although there are no great possibilities, under present conditions, it is of considerable value to the Colchester and Cumberland county fishermen in the Bay of Fundy. It is doubtful if it will stand up under the present two months' open season.

The swordfish catch was 4,713 cwt., having a value of \$32,349, as compared with 1,594 cwt. and \$16,676 in 1921. Of the total catch 1,735 cwt., were taken off the coast of Cape Breton and landed in Halifax and Canso.

*District No. 3.*—Comprising the counties of Lunenburg, Queens, Shelburne, Yarmouth, Digby, Annapolis and Kings—Inspector Marshall.

Total catch 1,792,172 cwts., having a landed value of \$4,755,383, as compared with 1,520,569 cwt. and \$4,919,220 in 1921.

Operations in this district compared favourably with previous years. The fishermen availed themselves of every opportunity that broken weather afforded with the result that the quantity of fish landed shows a gratifying increase over the catch of the previous year. The Lunenburg fleet had an exceptionally good year. The landings of the 92 vessels totalled 900,000 cwts., or 127,125 cwt. in excess of 1921. The markets for the prepared products were, however, very inactive, with the result that the greater portion of the catch was unsold at the end of the year.

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The lobster catch was 62,099 cwt., having a landed value of \$1,096,709, as compared with 146,390 cwt., and \$1,755,231 in 1921. It should be pointed out that the large catch of 1921 was due chiefly to the especially favourable weather conditions during the regular spring season, and particularly to the special fishing season of six weeks from November first, during which over 30,000 cwts., were taken. The pack was as follows:—

	Catch	Value	Pack	Value
		\$		\$
Lunenburg.....	1,220	15,900	142	4,686
Queens.....	2,165	32,449	3	66
Shelburne.....	18,766	329,789	4,551	154,231
Yarmouth.....	29,671	511,429	7,874	258,221
Digby.....	8,922	169,322	1,204	43,850
Annapolis.....	1,175	33,320		
Kings.....	180	4,500		
	62,099	1,096,709	13,864	461,054

The total cod catch was 1,244,233 cwt., having a value of \$2,497,875, as compared with 1,077,581 and \$2,191,302 the preceding year. The largest landings were at Lunenburg, Liverpool, Lockeport, Shelburne, Yarmouth and Digby.

The haddock catch was 104,532 cwt., having a value of \$209,875, as compared with 72,049 cwt. and \$148,423 for 1921; showing an increase in the catch of 32,483 cwt., and \$61,452 in value.

The catch of hake and cusk shows an exceptionally large increase over 1921, the total being 142,767 cwt., having a value of \$114,364 as compared with 42,714 cwt. and \$32,139 in value the preceding year.

The mackerel catch was 53,071 cwt., having a value of \$328,677, as compared with 28,726 cwt. and \$217,251 in 1921.

The herring catch was \$88,512 cwt., having a value of \$94,357, as compared with 61,419 cwt. and \$67,429 in 1921.

The salmon catch was 1,837 cwts., having a value of \$46,310, as compared with 1,311 cwts., and \$33,837 the preceding year. The increase in the alewife catch was over 100 per cent, or 9,746 cwts., as compared with 4,304 in 1921. The increased scallop catch was particularly noteworthy—10,682 barrels as compared with 4,673 barrels in 1921. This increase was due to the catches in the recently discovered areas of the Bay of Fundy. The probabilities are that this fishery will increase, and afford most remunerative employment for an increased number of persons for many years.

In only two fisheries of the district was there a decreased catch. Pollock shows a decrease of 7,582 cwt. and halibut a decrease of 3,410 cwt.

## NEW BRUNSWICK

The total catch was 1,551,377 cwt. having a landed value of \$2,705,783 as compared with 870,229 cwt. and \$2,218,439 the preceding year or an increase of 681,148 cwt. and \$487,344 as compared with 1921.

*District No. 1*—Comprising the counties of Charlotte, St. John, Albert, and the Bay of Fundy watershed of Westmorland county—Inspector Calder.

The total catch was 886,266 cwt., having a value of \$877,365, as compared with 454,323 cwt. and \$645,239 in 1921. The total marketed value of cured fish and fish products was \$1,639,091, as compared with \$1,363,049 the preceding year.

The lobster catch was 7,178 cwt., as compared with 9,012 cwt. for the preceding year, or a decrease of 1,834 cwt. The decrease was chiefly in St. John county. The Charlotte county catch was 5,745 cwt. as compared with 6,854 cwt. for 1921.

The cod catch was 41,435 cwt. as compared with 39,348 cwt. in 1921. The greater portion was landed at Chance Harbour, Dipper Harbour, Beaver Harbour, Wilson's Beach and Grand Manan. The haddock catch is decreasing each year.

The hake catch was 93,503 cwt., as compared with 38,426 cwt. in 1921. The large increase is not so much due to the increase in the run as it is to increased prices paid the fishermen. In 1921 the low prices prevented active operations. Dipper Harbour and Chance Harbour, in St. John county, and Beaver Harbour, Wilson's Beach and North Head in Charlotte county, are the chief centres of the hake fishery.

The herring catch was 157,001 cwt., as compared with 116,275 cwt. for 1921. The catch was almost entirely taken in the weirs at Grand Manan, where a large smoked herring industry has been developed.

The sardine herring catch was 244,553 barrels as compared with 152,300 barrels in 1921. While the catches in the weirs at Campobello and Deer Island were small, the fish were plentiful at Grand Manan. The fishery was, however, without a fair profit to the fishermen, as the average price was only about \$6 per hogshead of five barrels.

In the report for 1921 it was noted that the scales of the herring used for smoking were being utilized by an American Company for the manufacture of a fine quality of artificial pearls. This industry is now permanently located at Grand Manan and afford a most remunerative market for the sale of the scales. \$15,000 was paid the fishermen last year. The company operating, known as The Marine Fish Products Company, after several years' experience in experimenting with the quality of the scales from the herring taken at the Magdalen Islands, and also at certain canneries at Lubec, Maine—discovered that the conditions at Grand Manan were the most favourable, as the scales could be readily secured in a clean, fresh state, within a few hours after the fish are taken from the water. The probabilities are that the operations of the company will be largely expanded, and with great advantage to the fishermen.

*District No. 2*—Comprising the counties of Restigouche, Gloucester, Northumberland, Kent and Westmorland—Inspector Crocker.

Total catch 706,386 cwt. having a landed value of \$1,803,695, as compared with 414,137 cwt. and \$1,531,543 in 1921; or an increase of 302,249 cwt. and \$272,152 in value.

The lobster catch was 62,376 cwt., having a value of \$567,039, as compared with 59,453 cwt., and \$321,735 in value in 1921. The demand for canned lobsters, and the large expansion of the live-shipped trade, resulted in greatly increasing the prices paid for the catch and explains the large increase in the value as compared with the previous year. The pack was as follows:—

	Cases	\$
Restigouche.....	293	8,805
Gloucester.....	8,664	253,745
Northumberland.....	5,487	157,205
Kent.....	6,121	171,972
Westmorland.....	5,512	181,971
	<hr/> 26,077	<hr/> 773,698

The cod catch was 270,277 cwt., having a value of \$306,908, as compared with 75,361 cwt. and \$118,264 in 1921, or an increase of 194,916 cwt. and \$188,644 over the preceding year. About 80 per cent of the catch was taken in the Caraquet districts of Gloucester county, where a fleet of about 140 small

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tonnage boats were operated. This fishery was prosecuted with much greater interest than in 1921, as the prices were more favourable.

The mackerel catch was 23,441 cwt., having a value of \$89,306, as compared with 20,911 cwt., and \$69,751 in 1921. While the Grand Anse district of Gloucester County was the chief producing centre, a large proportion of the catch was landed at Shippegan, where excellent facilities exist for caring for the catch.

The herring catch was 207,318 cwt., having a value of \$108,538 as compared with 135,975 cwt., and \$88,951 in 1921.

The alewife catch shows a marked increase over that of 1921, as the demand was much greater. The catch was 22,357 cwt., having a value of \$24,856 as compared with 5,165 cwt. and \$5,272 the preceding year.

The salmon fishery gave a decrease in quantity and a decrease in value, the catch being 13,697 cwt., having a value of \$163,904, as compared with 15,658 cwt. and \$300,978 in 1921, when the prices received by the fishermen were unusually high. In 1922 a considerable quantity sold as low as .06 cents per pound.

The smelt fishery shows an increase in quantity but a decrease in value. The catch was 62,650 cwt., having a value of \$451,844, as compared with 62,041 cwt., and \$519,488 in 1921. The catch was poor in quality and small in size, large quantities being disposed of at .03 cents per pound.

*District No. 3.*—Comprising the waters of the inland counties of Kings, Queens, Sunbury, York, Carleton and Victoria—Inspector Harrison.

The total catch had a value of \$24,723.

While the waters of this district are highly prized by sportsmen, there are several interesting commercial fisheries carried on, such as shad, pickerel, sturgeon and whitefish. The shad fishery is again falling-off since the reopening of the fishery after the close period, and it would appear that the fishery should be closed for another period of years or extinction will soon follow. The catch the past year was only 1.224 cwt., valued at \$7,344, as compared with 2,055 cwt. and \$20,550 in 1921. The pickerel catch was 24,200 pounds, sturgeon 11,100 pounds and whitefish 1,500 pounds. Caviar, or sturgeon roe sold at \$1.50 per pound. The salmon catch was 42,400 pounds.

The fisheries of these waters, by their very nature, are subject to conditions that do not obtain in the regular commercial fisheries. Weather and water must needs be favourable, particularly with respect to the salmon fishery, in order that fish may ascend the rivers to the spawning areas.

The superintendent of the Tobique Salmon Club reported an unusually large run of salmon the fall season. He writes:—

"I am puzzled about the big run of large salmon that appeared in the lower part of the Tobique the last week in October. For about eight miles up the river was full of them. They made their beds and spawned there. There were no fish there until the time I mention, and salmon will never come down the river to spawn. When my wardens called my attention to them I made several trips there to watch their movements. They spawned and covered their beds on the 2nd, and 3rd of November—the latest I have ever known salmon to spawn. The salmon that had spawned at the head waters were passing out of the river when they (the late ones) were on their beds. The fish were so dark coloured that I did not think they were fresh from the sea. I am inclined to believe they were somewhat late in arriving at the mouth of the Tobique, and remained there on account of the very low water, but why were they so late in spawning? You may know something about this run of fish".

The explanation of this unusual run may be that the very low water conditions prevailing during the summer may have hindered the ascent of salmon, and therefore when they reached the mouth of the Tobique they were close to the spawning period and ascended the cooler waters for this purpose.

#### PRINCE EDWARD ISLAND

Total catch 198,243 cwt., having a landed value of \$904,659, as compared with 152,591 cwt. and \$468,791 the preceding year. The marketed value was \$1,612,599 as compared with \$924,529 in 1921.

The lobster catch was \$87,583 cwt., having a landed value of \$651,449, as compared with 63,816 cwt. and \$255,264 in 1921. The fishery was prosecuted with great activity and success. Over 69,000 more traps and 25 more canneries were operated than in the preceding year. It will be noted from the following statement that the value of the pack,—\$1,267,731 was about 30 per cent greater than the landed value of the total catch for all varieties of fish. The pack was as follows:—

	Cases	\$
Kings.....	16,329	481,294
Prince.....	17,467	531,202
Queens.....	8,424	255,235
	43,220	1,267,731

The cod catch was 31,493 cwt., valued at \$44,069; a decrease of 1,829 cwt. as compared with 1921. The demand was poor and the prices of supplies high, consequently little general effort was made to engage in the industry.

The mackerel catch shows a small decrease, 7,729 cwt., as compared with 8,204 cwt. in 1921. The spring run was a failure to the netsmen, although a considerable quantity were taken by hook and line.

The herring catch was 39,407 cwt., having a value of \$48,528, as compared with 30,441 cwt. and \$32,874 in 1921. The spring catch in the district from Morell to East Point was insufficient to supply bait for the lobster fishermen of that district and supplies had to be secured from the Magdalen Islands. On other portions of the coast the supply was adequate.

The smelt catch was 9,442 cwt., having a value of \$64,879; showing a decrease of 1,040 cwt. and \$2,042 as compared with 1921.

The oyster catch shows an increase of 1,419 barrels over the preceding year, or 5,211 barrels, valued at \$34,525, as compared with 3,792 barrels and \$25,669 in 1921. East and West rivers and tributaries, and also Vernon, Seal and Pownal rivers are well stocked with young oysters, with the probability that there will be increased catches in 1923. In the Richmond bay district the areas appear to be recovering from the blight of the past eight or ten years. The outlook for Grand river particularly, is good. The Orwell river beds were not fished, as the oyster meat showed a greenish tint and it was feared by the fishermen and buyers that the beds were diseased. An examination, however, showed that the tint was the result of local food conditions, and the tint, instead of having a detrimental affect on the quality, was of distinct advantage, as oysters of this character are highly esteemed by epicures, as the meat is usually plump and palatable.

Large districts of formerly heavy producing areas are so badly silted that the spat cannot catch. Alberton bay and adjacent districts are now barren. Oyster culture work is much needed, and it is hoped that early attention may be given to the revival of the oyster industry, not only in Prince Edward Island, but also in Nova Scotia and New Brunswick, where the possibilities of developing a large and profitable industry are excellent.

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## MAGDALEN ISLANDS

Total catch 266,904 cwt., having a landed value of \$412,513.

The islands were included in the Atlantic Division for the first time last year, and placed under the supervision of Inspector Gallant, with two efficient resident officers, Messrs. Arsenault and Chiasson, who are both supplied with motor-boats and give their whole time to the work.

The four chief fisheries are the lobster, herring, mackerel and cod, and are carried on with the following results:—

The lobster catch was 26,258 cwt., having a landed value of \$147,888, or an increase of 1902 cwt. and \$50,464 as compared with 1921. The pack was 12,943 cases, valued at \$379,048 as compared with 12,178 cases and \$272,313 the preceding year.

The herring catch was 135,246 cwt., having a landed value of \$41,239. The catch for 1921 was 103,938 cwt., valued at \$51,969. The market for the pickled product is very small, with the result that the greater portion of the catch has to be disposed of for bait, and the demand for such use has greatly decreased the past few years.

The cod catch was 27,660 cwt., having a value of \$41,482 showing a small decrease as compared with 1921.

The mackerel catch was 50,010 cwt., valued at \$166,455 as compared with 22,858 cwt. and \$91,432 in 1921, showing an increase of 27,152 cwt. and \$75,023 in value. In the first and second weeks of June a very large catch was obtained. As the facilities for taking care of the catch was poor the quality of the cured product was inferior, with the result that it had to be disposed of at a low price. A considerable quantity was taken with hook and line, for which good prices were realized.

Improved transportation connections with the mainland, and lower freight rates are greatly needed. Until such are secured little or no improvement in the fishing industry can be expected.

## INLAND AND RIVER FISHERIES

With the exception of a few districts the conditions affecting the inland fisheries are improving. Especial attention continues to be given to the prevention of pollutions and obstructions, and while it is quite impossible to afford adequate protection and supervision of the multitudinous rivers and lakes in the division, the results are fairly satisfactory, with the probability that increased catches will be taken by netsmen and anglers.

In Nova Scotia the anglers had a good year. On the St. Mary's, Guys-boro county, both netting and angling shows a decided improvement. One angler captured 55 salmon. Conditions on the Medway, Queens county, were more satisfactory than for some years.

The fall run of salmon was exceptionally heavy in all the rivers frequented by the fall run of fish. There is a growing demand that a special fishing season should be provided for the capture of these fish. East River, Sheet Harbour, Halifax county—one of the best salmon rivers—is being taken over by the Nova Scotia Power Commission to supply hydro power for Pictou county. A number of dams will be constructed during the coming summer; the one at Malay's falls, immediately above the finest pool on the river, will be the chief obstruction. While fishways will be constructed through all the dams in the main river there is little doubt but what the salmon run will be greatly interfered with, and this river as well as West river, Sheet Harbour, which supplies power for the Sheet Harbour Lumber Company, will cease to be considered one of the important salmon rivers.

In New Brunswick there was a heavy June run on the Miramichi and Restigouche, with the result that the head waters were well stocked. Fly fishing was excellent. The fall run was exceptionally heavy. In the netting district of the Miramichi the destruction of salmon by the constantly growing seal herds is a menace to the fishery and difficult to overcome.

On the St. John river and tributaries water conditions prevented successful angling. On the Tobique the anglers had a successful season.

Trout fishing was good throughout the whole of the Maritimes and afforded excellent opportunities to the large sport loving population.

#### FISHERIES PROTECTION SERVICE

During the past three years this service has been undergoing a thorough revision. Previous to the organization of the Atlantic Division for the purpose of closer and more economical supervision, there were thirteen boats owned by the department and in addition, five ships of the Naval Department, employed in Fisheries Protection service.

As this service was quite expensive and not wholly satisfactory, it was determined that in all suitable localities the fishery officers should be required to furnish motor-boats as part of their essential equipment, for the purpose of more effectively patrolling the waters of their districts. This policy is being gradually extended and perfected; thus relieving the department of the necessity of maintaining many of the patrol boats. As a consequence, three more of the boats will be disposed of the coming year. Only five boats of the original thirteen of the smaller craft, and two of the five Fisheries cruisers will be maintained.

The cruiser *Arleux*, Captain Milne, has the Bay of Fundy and Western Nova Scotia district, and the cruiser *Arras*, Captain Barkhouse, the remainder of the Atlantic coast waters of Nova Scotia, and also the Northumberland straits. Both ships, however, can be used on any part of the coast, when considered necessary. The following are summaries of the work performed by these vessels:—

#### *Arleux*

April 20, cruised the western division watching United States fishing craft; in the Bay of Fundy searched the sardine carriers to ascertain that they carried no fishing nets, etc. Searched the Bay of Fundy shores for breaches of the lobster fishing regulations, seining for herring, and the use of dynamite in capturing herring and pollock, carefully watching the fishing boats during the Sunday close season.

May 10, mackerel scouting on Brown's Bank, observed the advance schools of mackerel arriving on the eastern edge of the bank; followed these schools as they proceeded westerly along the coast showing intermittently.

June 15, at Canso following the United States seiners en route to home ports.

June 27, cruised the Bay of Fundy in search of illegal lobster fishing, destroyed a number of traps illegally set; also watched the large number of boats drifting for salmon off St. John county.

July 13-15, locating the distance off shore of the beds on which the boats were fishing scallops off Digby and Annapolis counties. On the 26th returned to the shores of southern Nova Scotia waiting for the incoming droves of sword fishermen from the United States and assisting the local fishery officers as required.

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August 1, received orders to proceed to the Northumberland straits and the northern shores of New Brunswick.

August 12-15, at Magdalen islands. On return to the mainland cruised the fishing grounds from Chockfish river to Caraquet and along the northern shores of Prince Edward Island. In this district a determined effort was made to fish lobsters during the close season. Destroyed a large number of traps illegally set and by remaining on the fishing grounds day and night prevented their illegal operations, causing them to discontinue same. Remained at these duties until October 7 when the ship returned to her station west of Halifax to follow the United States seining vessels catching the fall run of mackerel along the Nova Scotia coast.

October 23 to November 3, calibrating the wireless direction finding stations at Chedabucto and Red Head.

November 4, proceeded to the counties of Annapolis and Digby searching for illegal lobster fishing and new scallop beds. On the 10th obtained the loan of a scallop drag and dragged along Digby neck. On the 11th located a scallop bed off Whale Cove and another off Centreville. This latter proved to be the best scallop bed yet found.

December 4, proceeded to the southern shore of Nova Scotia watching a large number of United States fishing vessels that were using Shelburne as a base of operations, also standing by to assist the Lockport fishermen if required.

December 19 until the time of laying up, cruising the southern shore of Nova Scotia assisting vessels in and out of the harbour obstructed by ice.

On January 11 the ship was laid up and the crew discharged.

### *Arras*

The *Arras* was commissioned at Halifax, N.S. on April 1, 1922, and on April 3 proceeded to sea on patrol work on the western coast of Nova Scotia, the ship cruised, on the west coast of Nova Scotia until May 1, then we proceeded to the vicinity of cape Sable and took up the duties of mackerel scouting. The first mackerel was sighted on May 10, we then followed the fish as they worked east along the coast, reporting all movements of fish to you.

The ship followed the fish to bay Chaleur where the last schools were sighted on June 22.

The ship then proceeded on her cruising station on the eastern division, keeping in close touch with all fishing vessels working on the coast.

On July 1 the ship was taken from the Department of Naval Service and placed under the Marine and Fisheries Department.

The ship was kept cruising on her station until August 9, we then proceeded to Louisburg to watch the American sword fishermen working along our coast. The ship remained with the swordfishing fleet until September 5 when the last vessel left our coast. We then proceeded west with the swordfishing fleet to cape Sable, then we returned east along the coast keeping close watch on all American fishing vessels.

September 20 we proceeded to Prince Edward Island waters to watch the American mackerel seiners during the fall fishing season. We cruised on our station until October 15. We then proceeded to Canso to calibrate the D. F. Station; we then proceeded on our station until December 4 when we were ordered to Canso, N.S. to protect the Canso fishing vessels during the winter haddock fishing season. We remained with the Canso fleet until January 10, 1923, we then proceeded west and took up station on the west coast of Nova Scotia, assisting the fishing vessels and in keeping the ice broken in Lockport

harbour. We cruised on the western station until February 28 when the ship was laid up at Liverpool and all crew paid off except the captain, chief engineer and boatswain and oiler who were kept on for watchmen.

On March 28 the ship was taken in hand by the contractors for her annual refit.

We had very little illegal fishing on our station during the year. We always kept in close touch with American fishing fleet and watched every water where the Americans fish.

During the year we had 79 American fishing vessels on our station which we boarded and examined 142 times.

We had 26 American swordfishing vessels in our waters and 85 Canadian swordfishing vessels. These vessels came from all parts of Nova Scotia and made headquarters at Louisburg during the swordfishing season.

During the year we steamed 12,699 miles and were at sea 1,402 hours and consumed 1,201 tons of coal.

#### THE LOBSTER FISHERY

The importance of the lobster fishery is becoming increasingly apparent, as is evidenced by the unusual activities of both fishermen and packers. It is the most highly prized, and most vigorously prosecuted, of any of the fisheries of the Atlantic coast, as it affords most remunerative employment, and ready returns, to a large number of persons. Last year, 13,445 fishing licenses were issued, as follows:—

Nova Scotia.....	11,252
New Brunswick.....	2,609
Prince Edward Island.....	1,831
Magdalen Islands.....	374

About 1,210,000 traps were operated. The number of canneries in operation was 546. The total catch was 357,632 cwt., having a value of \$3,580,450. The total pack was 145,779 cases, valued at \$4,433,154 as compared with 130,469 cases and \$2,822,040 in 1921, or an increase of 15,310 cases and \$1,611,114.

The market for canned lobsters was active, practically all the supplies being exhausted within the first three months, resulting in unusual preparations by the fishermen and canners, and in exceptionally high prices being paid for the catches and pack of the early spring season, which opened in western Nova Scotia March first.

The demand continued strong throughout the year. The increase in the number of fishermen and in the traps operated was the greatest for any single year in the history of the industry. The June catch in the Cape Breton district from Pleasant bay to Margaree harbour, Inverness, was over five times greater than for the same month of 1921. In Cumberland county the increase in fishermen and quantity of gear used was about 200 per cent, and the number of canneries in this county increased from six to eleven. The unusual activities resulted in many instances in the available supply of fish becoming exhausted before the end of the various fishing seasons. It should be noted that similar conditions also obtained in New Brunswick and Prince Edward Island.

The one sore spot was western Nova Scotia, particularly the consistently large yielding district of Yarmouth and Shelburne counties, where the decrease in the catch and pack was over sixty per cent, which may be attributed in part to the large catches taken during the special fishing season of the fall of 1921, and in part to the fact that the weather conditions prevailing throughout the spring fishing season were not nearly as favourable for successful operations as prevailed the previous spring.

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The decrease for western Nova Scotia was 17,000 cases, that for Yarmouth being 6,758 cases and for Shelburne 7,040 cases. Notwithstanding this extraordinary decrease the total pack for the whole province shows a decrease of only about 3,750 cases.

The present regulations require revision, as the conditions in some districts have greatly changed the past few years. It is probable that the revision will take place the coming year, and will needs be made with great care, as the problem is a most vexed one, since a satisfactory re-arrangement of the fishing divisions and seasons is difficult. In any event the preservation of the industry should have first consideration.

## THE DRIED FISH TRADE

Attention has been called in previous reports to the failure of our dried fish trade to hold certain important export markets, particularly Cuba. The Trade Commissioner for Cuba, Mr. G. R. Stevens, reports that the quantity of cases of dried fish exported from Canada dropped from 80,137 cases of 100 pounds in 1921 to 34,127 cases in 1922. Since the war Norway is regaining much of the trade formerly held by that country, notwithstanding that every advantage is with Canada, as Norway is several thousands of miles further from Cuba than Canada, and is forced to rely on a monthly steamship service, with much heavier freight rates.

The commissioner states that there are only two influences favouring Norwegian fish, and of these only one is important. The lesser advantage of the Scandinavian fish lies in the willingness of some Norwegian exporters to forward fish upon consignment. This is an attractive method of merchandising for the importer, and with reliable consignees, the returns from such shipments will probably be satisfactory. But consignment business in almost any line of export tends to run itself into the ground, and it is particularly apt to do so in Spanish-American countries. On the other hand, some of the Norwegian shippers are demanding more stringent terms of payment than the Canadian shippers, and although their fish keep no longer, is not better packed, nor superior in any way except appearance, they are beginning to command the market. The reason and its solution are simple; the Canadian shippers have been trying to make Cuban importers buy black nape fish; and they will not touch black nape codfish while white nape are to be had.

The difference in price between the white nape fish and the black nape is 50 cents per hundred pounds, and there is every reason to believe that Canadian fish need not undersell Norwegian fish if the black nape is removed, but can drive them from this market through advantages of freight and proximity, and at the same time obtain higher net returns for the Canadian exporters. The Cuban agents of the Canadian fish exporters, the steamship companies which carry the fish, and many foodstuff distributors believe this, and they are really in a position to know.

The Lunenburg dealers have taken a favourable view of the representations of the Trade Commissioner and it is quite probable that white-naping will be adopted the coming year.

## COURSE OF INSTRUCTION

The third annual instructional conference of fishery officers of the Atlantic coast was held at Shediac, N.B., beginning September 20.

Four addresses on "Sanitation in Lobster Canneries" were given by Dr. A. P. Knight, Chairman of the Biological Board. These addresses were most timely, as the revised regulation governing the subject had recently been adopted after close investigation by Dr. Knight and his assistants.

The lobster fishing and canning industry of the Maritime provinces is valued at about seven million dollars annually. Efforts to improve the quality of the canned product and to ascertain the best methods to be adopted to avoid discoloration of the contents of the tins have been under investigation by the department for some years, as the annual loss to the dealers and exporters has been heavy. The systematic and persistent experiment and investigations, under the leadership of Dr. Knight, were taken up some three years ago, and as the result of the adoption of many of his suggestions, a very decided improvement in the quality of the goods has taken place.

The lectures and demonstrations given at the conference on the need of providing the highest possible sanitary equipment of the canneries, and methods of packing and processing, elicited the keenest interest and debate, and will be of undoubted value to the officers in administering the provisions of the Meat and Canned Foods Act and regulations.

The addresses by Dr. Huntsman on "Conditions in the Water," and "How Typical Food Fishes Live," were unique not only in the method of presentation, but also for the manner in which they were illustrated.

Without doubt, the addresses and demonstrations given by Doctors Knight and Huntsman, with the assistance of Andrew Halkett, the naturalist of the department, were the most systematic, important and interesting ever given in Canada for the training of fishery officers.

The conference was of a most serious mind, and the intentness with which the work was followed gave evidence that the officers fully appreciated the need of the special training being given.

The second part of the program dealt with "Administration" and "Methods of Work," and was confined wholly to discussion and interpretation of the provisions of the regulations, and better methods of supervision and protection. The presence of W. A. Found, Assistant Deputy Minister, was much appreciated, and his addresses not only to the point but highly illuminating.

Special emphasis was placed on the attitude that should be taken by the officers in dealing with the fishermen and others engaged in the industry. Co-operation, encouragement and good judgment were shown to be essential qualifications for efficient service. Happily the past few years a much better understanding has been arrived at, as the officials and the trade have come to the conclusion that their interests are identical. The encouragement of the industry and the betterment of the trade must always have first place. The regulation of the fisheries and the enforcement of the laws are matters largely of detail in conservation and protection, but are both of great importance if the industry is to be wisely administered. Without adequate knowledge of actual conditions and the requirements of the industry, confusion is bound to result. It was urged, therefore, that it is important that the officers should be in a position to intelligently discuss any problems that might arise, in order that the department may be advised as to the best methods to be adopted in the regulation and administration of the fisheries of the Maritime provinces.

#### SPECIAL MATTERS

(1) *Mackerel Seining*.—For some years past the American fishermen have had a considerable fleet of mackerel seiners operating off Nova Scotia coast with considerable success, and this fleet was augmented by a number of additional vessels the past year.

Little or no effort was made by the Nova Scotia fishermen to engage in this industry until the past year, when the following vessels, outfitted for

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mackerel seining: *Helen G. McLean*, *Helen M. Coolen*, *Douglas B. Conrad*, *Nellie Banks*, *Yafico*, *D. C. Mulhall*, *National II* (gasoline), and *Lemberg* (steam trawler).

In addition three purse seines were operated from small boats in the Halifax district.

The opportunities for large catches were not as favourable as usual as the mackerel schools skirted the coast close to the shore, to the advantage of the net fishermen but to the disadvantage of the seining fleet, as such fishing is prohibited within the three mile limit. Several of the Nova Scotia fleet made very good catches, particularly the *Helen G. McLean* and the *Helen M. Coolen*.

(2) *Transportation*.—The handling and marketing of the large supplies of mackerel taxed the ingenuity, often the patience of the dealers, as the transportation facilities were poor, particularly along the south coast to Yarmouth, where the conditions were most unsatisfactory. Shipping by the Halifax and Southwestern Railway is a gamble, as the rails and roadbed are too light and poor for heavy shipments, with the result that large quantities of fresh mackerel arrived in Yarmouth too late to make steamer connection for Boston.

In the extended and valuable coastal fisheries district from Halifax to Guysboro, the lack of suitable transportation severely handicaps the industry and offers little hope for development of the fisheries of the district. A railway line, or more adequate steamship service, is essential.

(3) *Cold Storage*.—The fishermen of Cape Breton have been handicapped by a lack of proper cold storage facilities. A company has been organized at North Sydney and the work of construction of the plant is now under way and it is expected that the plant will be ready for business in the early spring; 165,000 cubic feet of space will be devoted to fish storage.

The Universal Fish Company constructed a general fishing plant at Hubbards, Lunenburg, with the intention of operating a fleet of six vessels for halibut fishing, mackerel seining and salt fishing.

At Shippegan, N.B., the Monarch Cold Storage Company have converted the dog-fish plant, formerly owned and operated by the department, into an ammonia process freezer. The fish are conveyed by endless belt some 600 feet from the wharf to the freezer. This plant is valued at \$25,000. Shippegan is well equipped in this respect, having five cold storage plants.

(4) *Improved Canning Conditions*.—About thirty new lobster canneries have been constructed, nineteen being on Prince Edward Island, where also 16 canneries have been thoroughly reconstructed or otherwise renovated. The quality of the pack continues to improve, as a result of the investigations and educational campaigns carried on the past three years. The revision of the regulations, which will probably be completed the coming summer, will further assist in improving the pack, as special provisions contemplate requirements with respect to sanitation and equipment that will bring canning operations to a high standard.

(5) *New Markets*.—Several of our firms have shown great enterprise in endeavouring to open new markets for our fish products, both in Canada and in foreign countries. Experimental shipments to distant ports hitherto untouched were encouraging. It is apparent, however, that any real success depends on preparing the products in such manner as to meet the peculiar demands of the trade.

The retention or development of the foreign markets for dried and pickled fish has not been an easy task, as the general disruption of trade, due largely

to the exchange situation, has been an unfavourable governing factor. And in addition, the endeavours of competing countries to dispose of large stocks has added to the difficulties of our merchants.

#### APPRECIATION

Appreciation of the earnestness with which the officers have performed their duties is a gratifying privilege. The work was fully up to expectations. While the organization of the Atlantic Division followed the termination of the great war, with all the vexing problems involved in a return to peace conditions, our officers have quite generally exercised a wholesome spirit of co-operation with those engaged in the various branches of the fishing industry.

#### MACKEREL SCOUTING, 1922

*Report by Captain Barkhouse of C.G.S. "Arras"*

#### SPRING

Mackerel were located in the channel between George's bank and Brown's bank on May 10. This body of fish was moving slowly northward and approaching the southwestern edge of Brown's bank, they were very wild and only showed at short intervals. The same evening another school was located on the western edge of Brown's bank; this latter school was 68 miles southwest magnetic from cape Sable. All the above fish were halted in their northerly migration by strong northerly winds, which caused them to work around the south-eastern end of Brown's bank and approach the Nova Scotia coast in the vicinity of Cape Negro.

The weather then became unfavourable and fish were not located again until May 16, when a large body was sighted coming in between Brown and LeHave banks. These fish were showing on a frontage of four miles. The following day this body was scattered and formed in many small schools on the western edge of Brown's bank and in the channel between LeHave and Brown's bank.

On the 19th a large body was sighted 10 miles west of Seal island. This body was working fast up the west coast of Nova Scotia and the first catches were made in the traps at Cranberry head on May 20.

The first body approached the coast near cape Negro and the first catch by seines was made by the trawler *Surf*, which filled up on the night of May 23. These mackerel followed the coast line right to Prospect, where on the 26th and 27 large hauls were made in nets and traps. On the 30th the fish were on Sambro bank and American and local seiners were filling up. These fish held the coast and large catches were made by seiners and shore nets.

On the 5th of June the fish had reached Northern Cape Breton waters and many were taken at Ingonish. They took the channel between cape North and St. Paul's island and went on towards Magdalen islands, where many were caught on the 16th. The last schools were sighted between Magdalen islands and the north side of Prince Edward Island. The fish then stopped schooling and apparently went to the bottom. It was seen that all nets set near the top of the water produced no fish whilst those set towards the bottom were very successful. On the 20th between Miramichi and Miscou island 125 sail boats were taking mackerel with hook and line. We then cruised between Anticosti island and Gaspé but no fish were sighted.

On June 19 I examined fish taken at Malpeque. They were only partially filled with spawn, but the fish taken by hook and line off Miscou on the 21st showed no spawn at all.

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This year the mackerel were much nearer the coast line than previously. This, I think, is in a large measure due to the immense quantities of mackerel feed, a small fish known to fishermen as "All Eye", which was on the coast this year. This is the first year since 1906 that these small fish have been seen in large quantities, and in the above named year mackerel frequented our harbours practically the entire summer.

The waters of Halifax and Guysborough counties were this year covered with a slimy substance, which greatly interfered with nets and seines. It is not known what caused this slime but it was observed that the mackerel feed previously mentioned was mixed in with it and in all probability fed on it.

It may be pointed out that there is a greater interest being developed in mackerel fishing. This is evidenced by the fact that this year seven Canadian seining vessels and one Canadian trawler operated on our coast. This is the largest number of purse seining vessels that have ever operated here and I think the interest now being displayed by our fishermen is largely due to the efforts of the department.

All the vessels kept in close touch with us and received all the information we were in a position to give them.

## FALL

The migration of mackerel from the lower Gulf of St. Lawrence towards southern waters was carefully noted this fall, as this was the first time the work has been undertaken by the department I gave all my time and experience to the work.

We have discovered that the mackerel move, after schooling, in large waves or bodies. This fall the mackerel moved out of the St. Lawrence in three waves and about two weeks apart, the mackerel during the time of each wave passing were showing in small schools on a radius of 40 miles along the coast.

The mackerel were first noticed schooling on August 25 between East Point P.E.I., and Magdalen island. The first large body of mackerel moved very rapidly and passed out of the Gulf between cape North and St. Paul's island, following the coast of cape Breton it passed Scatarie island September 2 and moved west along the Nova Scotia coast. Large catches were taken in Chedabucto bay, St. Margarets bay and off Liverpool. We followed this body of fish as far as Shelburne and then returned to the lower St. Lawrence.

The second large wave or body of mackerel moved out of the gulf on September 15, this body of fish was slower in moving along the coast. Part of these mackerel passed south through the strait of Canso, but the largest body passed out between cape North and St. Paul's island. These fish held close to the shore and large catches were made as they passed along the coast at Chedabucto bay. Boats along the coast of Nova Scotia did very well.

The third and last large body of mackerel passed out of the gulf on October 11. This body of fish was first sighted on October 2. It seemed very slow in moving. We followed this body along the coast as far as cape Sable where the last fish were sighted on October 28.

REPORT OF CHIEF INSPECTOR G. S. DAVIDSON, CENTRAL  
FISHERIES DIVISION, 1922

I have the honour to submit my annual report on the fisheries of the Central Fisheries Division for the year 1922.

A decrease in production for the year 1922 will be noted, which may be ascribed, to a great extent, to the long open fall and early part of the winter fishing season; ice sufficiently strong to allow of the fishermen carrying on operations from the ice, not forming until well on into December. This undoubtedly caused a very considerable reduction in amount of fish produced.

In the province of Alberta, northern portion, which contains the commercial fisheries, conditions have not altered greatly from those reported last year. The prices obtained for the catch, and the market for same being about the same.

The operations at lake Athabasca which were reported in 1921, as having been commenced, were not carried on this season. Difficulty in obtaining a market for the product of the cannery, uncertain transportation and difficulty in placing the product on the market being the chief reasons for the stoppage of operations, and until these two difficulties are overcome it is hardly possible that success can be obtained in these operations.

Winter fishing operations in three restricted areas on Lesser Slave lake have been carried on this year for the first time, and as far as can be judged at the close of the year had been successful; though a considerably higher proportion of whitefish were taken during the operations than had been anticipated. Request was made that further areas be opened to like fishing, which, however, the department could not see its way to grant. I am of the opinion that sufficient areas are now open to meet the demands of all who desire to carry on winter fishing. The present areas are available to all with but short distances to travel and are located close to shipping facilities. Lesser Slave lake is the best producing lake in Alberta taking it from year to year, while fished as close to the line of safety as is considered wise, there is never any danger of depletion and if fishing in these waters is continued on the same basis as at present, and under the same regulations, there will be an unfailing supply of marketable fish of the first class for years to come.

The Buffalo lake fisheries have not been fished so heavily this year, the cost of getting out the catch is a drawback to these fisheries.

In southern Alberta there is an increased interest shown in the protection of the streams containing sporting fish, the closure of a number of the streams in past years is now showing its effect, many of the streams which two or three years ago were considered depleted now being well stocked. The two southern districts have been thoroughly patrolled during the past year, and it is pleasing to know that at last people are beginning to realize the value of these streams and to co-operate with our officers in every way to afford them protection. Well meaning persons demand the employment of fishery guardians wherever they think they are needed, losing sight of the fact that it would be an impossibility to have special guardians on each and every stream owing to the expense incurred. There can be no doubt however that the protection afforded these streams during the past year has been good in every way. That there have been many less violations the past year, taken with the fact that there was a large increase in the number of angling permits issued, will go to prove that the fact that these streams are receiving protection is recognized by the general public.

In the province of Saskatchewan while the total catch shows a decrease from last year, the value is greater, owing to the higher prices obtained for the fish. Open weather in the month of December had its effect in decreasing the

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catch considerably. No changes of importance have taken place in connection with the fisheries of this province during the year; they are in a healthy condition and are now back to normal, after three or four years of unsettled condition caused by bad markets. Every, and sufficient protection is being afforded the fisheries of Saskatchewan under the administration of the present staff.

The province of Manitoba shows a considerable decrease in catch during the past year. Here again the open winter at the start of the season had a great effect. The summer whitefishing in Lake Winnipeg was not successful, being very disappointing to the fishermen, the catch amounted to 24,476 cwts. as against 29,660 cwts. last year. The decrease cannot be put down to depletion, but rather to natural causes. There were long and continued storms during nearly the whole of the fishing season, when the fishermen could get on the grounds they could not find the fish; apparently the fish had sought new feeding grounds, and when they did come back to the usual grounds it was only in small numbers and late in the season. The water in lake Winnipeg was from two to four feet higher than for many years past, and this may have had something to do with the movements of the fish, inquiries show that this condition has obtained at different times in the past. On the other hand pickerel have not been so plentiful in these waters for many years past. An extension of the whitefish season was requested but it was not considered desirable to grant it.

The restrictions against fishing in Sturgeon bay, which has hitherto been a reserve for hatchery purposes, was taken off, owing to its being thought that the coarsefish were increasing to an extent that threatened the whitefish supply. Operations here commenced in December and up to the end of that month would not indicate that the coarsefish were as plentiful as had been thought. The catch being reported very light. The opening of these waters should to some extent relieve the pressure on lake St. Martin, which in my opinion should be closed to all commercial fishing operations for a period of not less than three years, in order to allow it to become stocked again. There can be no doubt of this lake being depleted, the fisheries have been going back for the past two or three years, this matter is now being investigated and a report with such recommendations as may appear necessary will be made.

Winter fishing at lake Winnipegosis was below the average of last year, though the summer fishing was good. I have at different times received complaints that the use of small meshed nets in certain parts of this lake was prevalent, a thorough investigation tends to show that these reports are much exaggerated and that there are no good grounds for them. In one area, in which it was stated that there were dozens of these small meshed nets was visited by an overseer from another district. He examined a large number of the nets found set in different parts of the area and found none at all of illegal mesh. This is getting a long way towards getting proper observance of the regulations by the fishermen, and I think that I may say that they are beginning to realize that it is as much to their own interests to use legal nets as anything can be. In places where we have had nothing but opposition in enforcing the regulations in regard to the use of legal meshed nets it is found that those who were most opposed are now willing to help our officers, and make no objection to stating that the department did them the best turn possible when it insisted that the use of nets of illegal mesh be put an end to.

The catch from Lake Manitoba during January and February, 1922, was shipped green, commanding a high market price on the United States market. The winter fishing this year from November 15 to December 31 was somewhat disappointing, owing to the late forming of the ice, and after that another breakup, so that it was rather late before fishing operations got under way, when the catch was not as good as expected.

Indications are that the fishery business in the provinces comprising the Central Fisheries Division has got back to a normal basis with a steady demand for the fish, and with good prices. Inquiries made show that the stocks of frozen fish on hand are sufficient to take care of the trade until the summer fishing commences, and that practically none of this frozen stock will have to be held in storage.

Observance of the fishery regulations has been enforced by the several fishery officers with firmness, but at the same time with a view to imposing as little hardship on the fishermen as possible. Taking into consideration the extent of territory covered by this division, it may be said that generally the regulations are well observed. There are one or two points which are exceptions, but they are gradually being brought into line.

There appears to be a greatly increased tendency towards asking for extensions of the fishing season. In many cases of this nature there is no reasonable ground for such a request, and I think that the action is not started by the fishermen themselves, but by those who are either interested in handling the catch, or to whom the fishermen may be indebted, and who hope by getting an extended season to clear off some of the liabilities.

I am pleased to report that the officers of this division have performed their several duties in a satisfactory manner.

REPORT OF CHIEF INSPECTOR, MAJOR J. A. MOTHERWELL,  
WESTERN FISHERIES DIVISION (BRITISH COLUMBIA)  
FOR 1922

SALMON

The total pack of all varieties of salmon in the province of British Columbia during the year amounted to 1,290,326 cases, as compared with 603,548 cases in the year previous and 1,616,127 cases in the year 1918. In only four years since 1894 has this total pack been exceeded in the province. By referring to statement No. 1 it will be observed that the total pack of sockeye, the most valuable variety, amounted to 299,614 cases against 163,914 in 1921 and 276,459 cases in 1918. The pack of this variety on the Fraser river exceeded that of the previous year by 12,844 cases and the brood year four years previous by 31,895 cases.

The quantity of sockeye taken by the Americans on Puget sound from the run as it was passing through American waters on its way to the spawning grounds of the Fraser river amounted to 48,566 cases, which, including the pack on the Fraser river, resulted in a toll from the Fraser river run of 87,310 cases as against 67,572 cases in 1918. The fishermen of Puget sound usually account for approximately 75% of the pack of sockeye taken from the run heading for the Fraser river and the Canadian fishermen have to be satisfied with the remaining percentage although the salmon are hatched in Canadian waters and the Canadian Government has spent in fish cultural operations large sums of money each year for the purpose of keeping up the run. During the year 1922 the catch of the Canadians equalled that of the Americans but this was due to the unusually small amount of fishing equipment operated in Puget Sound compared with other years.

This year's pack of sockeye on the Fraser was the largest since the year 1917 when 123,614 cases were put up but even this amount is infinitesimal in comparison with the pack of previous years especially the fourth or "big" year when as many as 990,313 cases were canned in one year, in 1901, and in an off year following the previous "big" year as many as 293,477 cases were packed.

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On the Naas river the pack of sockeye amounted to 31,277 cases which is the largest since 1916 and is a good average pack of this variety for the locality. These satisfactory figures were rather unexpected after the practical failure the year previous and the gradual decline in the catch during the past few years.

In the Skeena the pack of sockeye was 97,674 cases, as against 40,018 cases in 1921. Like the Naas, the 1922 run is made up largely of four and five year fish and the season was as good as could be expected. At this point the natural conditions in the way of tides, river current, bars, weather, and snags, go a long way towards protecting the runs of salmon and it is not anticipated that there will be any appreciable depletion in the future so long as present conditions do not materially alter.

The pack of sockeye at Rivers inlet is shown as 60,700 but 7,000 cases of these were brought from Smiths inlet which leaves a net pack of 53,700 cases at Rivers inlet. This is somewhat below the average especially in view of the fact that there were 1,012 gill-net licenses issued for the district. However, as in the case of the Skeena river a very satisfactory proportion of the run passed through to the spawning grounds.

The catch at Smiths inlet amounted to 14,227 cases taking into account the 7,000 cases packed at Rivers inlet and 712 cases packed at Shushartie. The result at this point can be regarded as extremely satisfactory and the spawning areas were well seeded.

It will be observed from statement No. 1 that a much larger pack of pinks and chums was put up during 1922 than in the previous year. This is partly accounted for by the fact that it was the big pink year on Queen Charlotte islands where this variety is of such a high quality. In 1921 owing to the market being glutted with these varieties of fish there was practically no sale for them but the following year the old stocks having been disposed of the way was open for a larger pack and these, particularly the chums, have found a ready sale. Unfortunately the market has never been good for canned springs and cahoes and although the runs of these varieties, especially the latter, have been good, there has been no incentive to place them in cans.

Until very recently, owing to the good price obtainable for the sockeye variety, these were looked to by the packers to carry a very large proportion of the expense of canning all varieties but due to a very large extent to the keen competition from the Siberian salmon on the English market there is not now as large a profit from the sockeye pack in British Columbia. In fact there is difficulty in moving those put up during the season 1922 at a price which will realize any profit at all. It is becoming more and more apparent that the industry must count no longer on making considerable profits on the sockeye variety but must look to pinks and chums very largely for their returns in the future. Undoubtedly the principle of packing considerable quantities of the cheaper grades of salmon which can be sold readily at a small margin of profit instead of giving so much attention to the packing of the more expensive variety in which there is at present little profit and which cannot be as easily disposed of, is economically sound.

With the price of sockeye on the Fraser river for instance averaging 80 cents a fish and an average of twelve fish being required to fill a case, it is difficult to see how any profit at all can be made by cannerymen when, added to the initial cost of \$9.60 a case for the raw material, is the actual cost of packing, the insurance, overhead and other expenses necessary before the finished product is placed on the market. In the north the prices paid to the fishermen during the past few years have been between 30 and 45 cents, which are greatly below the prices paid on the Fraser, but on the other hand the cost of packing in the north is greater than in the south owing to the cost of transportation of supplies,

higher wages, and the necessity for taking employees north and returning them at the end of the season. The cost of shipping the finished product to the distributing centre is also an important factor to be taken into consideration.

#### HALIBUT

The catch of halibut for the year totalled 260,765 cwts., the Canadian boats accounting for 87,445 cwts., and the American boats 173,320 cwts. Owing to the Fordney-McCumber tariff which came into effect in the fall and which provides for a 2 cent a pound duty on fresh or frozen fish coming into the States when caught otherwise than in American bottoms, Canadian fishermen are obliged to accept 2 cents a pound less than their American competitors. The halibut business has been retained, however, at the Canadian ports of Prince Rupert and Vancouver and the business provided for the Canadian railways has been very considerable especially from Prince Rupert from which point the largest quantity of halibut is shipped in bond to the United States over the Canadian National Railway system.

The proposed close season for halibut fishing which has been demanded strenuously by all those interested on both sides of the line bids fair to become a fact at last and should result in infinite benefit to the industry.

The following is a statement of the quantity of halibut landed in British Columbia during the calendar year 1922:—

	Cwts.
Prince Rupert.....	251,605
Vancouver.....	9,160
Total.....	260,765

#### Halibut landings in British Columbia, 1913 to 1922:—

	Cwts.
1913.....	127,853
1914.....	156,106
1915.....	245,592
1916.....	257,794
1917.....	237,411
1918.....	166,805
1919.....	191,986
1920.....	220,890
1921.....	282,041
1922.....	260,765

#### HERRING

Apart from the herring used for halibut bait and dry salting there was no very considerable quantity utilized, although a certain amount was kippered. It is regrettable that there is no appreciable market for British Columbia Scotch-cured herring; the chief market, which is in the eastern States, is taken care of to a large extent by the products of the North sea which can be placed in New York at a considerably lower price than can those from British Columbia. Efforts are being made, however to build up a domestic trade in pails and these efforts are worthy of every encouragement.

It is interesting to note that during the past year approximately 40,000 cwts. of Scotch-cured herring were shipped from Alaska through Prince Rupert to markets in the eastern States. Due to the Fordney-McCumber tariff the Alaskan product has an advantage of one cent per pound over that from British Columbia on the American market.

There would appear to be every reason to believe that herring fishing can be prosecuted during the whole year off the coast of this Province and it is

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hoped that conditions will shortly be such as to induce the operators to make the necessary experiments instead of, as in the past, waiting for this variety of fish to come into certain bays and inlets where they can be captured with the minimum of effort.

## SUNDRY VARIETIES

The numerous other varieties of edible fish continue to be taken in fairly large quantities although the market is a limited one. Since the government has withdrawn the assistance by way of a rebate of express charges to points as far east as Manitoba the demand has been difficult to maintain.

## WHALING

Owing to the recovery of the market for products of the whale, the stations at Naden Harbour, Queen Charlotte islands, and Kyuquot, west coast Vancouver island, which closed down during 1921, were again operated. From each of these two stations two boats engaged in the capture of whales for a period of five months and at Kyuquot additional boats were utilized for one month. As a result of these operations the following numbers of whales were captured:—

Species	Naden Harbour	Kyuquot	Total
Fin.....	57	37	94
Humpback.....	27	23	50
Sperm.....	7	31	38
Sulphur.....	4		4
Sei.....		1	1
Totals.....	95	92	187

## FUR SEALS

Fishing for fur seals resulted in 930 being captured off the coast of this Province by the Indians. The price paid for the skins, however, was considerably less than during the previous season although certain of the Indians did very well during the time the herd was passing up the coast.

## REDUCTION WORKS PLANTS

Five reduction works plants were operated during the year. For a time following the war conditions the market for products of such plants was most uninviting and it was with difficulty that the operators were able to carry on. However, the prices of oil and fish meals showed considerable strength later in the year and gave the owners of the plants considerable encouragement.

In the waters adjacent to the American boundary in the south, as a result of the protection afforded American fishermen by the Fordney-McCumber tariff, it has been possible for American buyers to come across from Puget sound and outbid the Canadian establishments by as much as \$3 per ton for the raw products in the way of grayfish captured on this side of the line. The Canadian industries are finding this extremely embarrassing and claim that under these conditions it is practically impossible for them to operate.

## HAIR SEALS AND SEA LIONS

The immense damage to the fishermens' catch and nets owing to the depredations of hair seals and sea lions is common knowledge. In the Fraser

river, Smiths inlet, Rivers inlet, Skeena river, Naas river, and in fact in all salmon areas, these mammals will totally destroy or mutilate as high as 30 per cent of the number of salmon taken in gill-nets and in fact fishermen have recorded drifts when every salmon taken by the net has been totally or partially destroyed by hair seals before the net could be lifted and the catch secured.

Many suggestions have been made with a view to eliminating these mammals but to date no satisfactory method has been devised. In the winter of 1921-22 owing to strong representations made by the fishermen, cross lines were permitted to be operated in the Fraser river for the purpose of taking hair seals but between December 1 and May 31, although equipment was operated by 23 fishermen, only 13 hair seals were captured which proves conclusively that this method is not a satisfactory one.

In the early part of July the C.G.S. *Givenchy* was dispatched to the Pearl rocks, opposite Rivers and Smiths inlets for the purpose of demonstrating the efficacy of machine gun and rifle fire on the sea lions which gather in large numbers on the rookeries in the early summer months. It is estimated that with approximately 600 rounds of ammunition 220 sea lions were accounted for. Owing to the fact that the pups were fairly well grown the success of the operation was not as great as anticipated but it is the intention to next year proceed to the same point a month earlier when the pups are very young and when it will be a simple matter to destroy them by means of clubs, reserving the machine gun and rifle fire for the parents.

#### PATROL SERVICE

On the 1st of July, owing to the Fisheries Protection service being absorbed by the Fisheries Patrol Service, the steamers *Malaspina* and *Thiepval* became available and were utilized to a considerable extent assisting in the supervision of the salmon and other fisheries instead of being confined solely to the halibut fisheries and the three mile limit. With the addition of these two boats the patrol fleet consisted of three steam trawlers, one other steamboat and 21 gasoline boats belonging to the department. In addition 50 gasoline boats and 7 row boats were chartered from various parties, for periods ranging from one to six months, during the fishing season, making a total of 82 boats.

Experience has shown that instead of the small launches or boats built merely for speed and appearance on inside waters, something more after the style of a seine boat is necessary in such waters as Rivers inlet and for the purpose of taking the several inspectors over their districts. In this connection it is very gratifying to note that there is a prospect of the impractical and extremely expensive "Fispa" being disposed of and a boat more efficient and less costly of operation being provided in her stead. Undoubtedly as new boats are required of sufficient size as will permit, the gasoline and distillate engines should be discarded for those of the full Diesel or semi-Diesel variety. The saving in the cost of operation is enormous and their efficiency is as great, if not more so, than that of gasoline engines.

#### REGULATIONS

In January, following the non-success of the attempt to get together with the Washington State Fisheries Board with a view to the conservation of the Fraser river salmon runs, a separate attempt was made to obtain the co-operation of the State Board for the purpose of providing a weekly closed season of sixty hours for sockeye fishing on the Fraser river and Puget sound. The state

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board, however, felt that as it had advised the Washington State industry that no further measures would be taken during the year it would not be possible to enter into the suggested arrangement.

With a view to encouraging white and Canadian Indian subjects to enter the fishing industry in the province a reduction of 33½ per cent was made this year in the number of salmon trolling licenses issued to other than resident white British subjects and Canadian Indians. As a result considerable difficulty was at first experienced in effectually enforcing such reduction and it became necessary to amend the regulations in such a manner as to provide for definite control of fishermen and boats leaving the shores of Canada to operate in extra-territorial waters.

The records of the catch of sockeye in district No. 2 up to 1921 showed conclusively that some additional measures were required in order that conservation might be properly provided for and six hours were consequently added to the weekly closed period in all sections of the district. Judging from the reports on the several spawning areas, the results well justified this curtailment of fishing operations.

Special attention was given to the protection of the salmon waiting at the mouths of streams for high water which would enable them to ascend to the spawning grounds. Owing to the great distances and areas to patrol this is a very difficult matter but it is believed that the regulations in this respect were reasonably well enforced. The reports received on the spawning areas would appear to confirm this conclusion. It will be appreciated that with a large percentage of the fishery guardians being seasonal employees only it is difficult to procure the services of experienced and competent men.

In certain portions of the northern district it was found that sufficiently good results were not being obtained from the patrol service and it is the intention to, when the time arrives for re-employment for the season 1923, arrange for a partial reorganization.

It is interesting to observe that during the year there were 173 prosecutions for violations of the fishery regulations.

## ANGLING

Each year more and more attention has to be given to angling in the province. As the country becomes more settled and is better known as a fisherman's paradise new demands are made on the department's officers for closer supervision of the sporting streams. Owing to the great extent of fishing area it is a very difficult matter even in the vicinity of the thickly populated districts for the several officers to keep as closely in touch with angling conditions as could be desired. It is hoped, however, that with the assistance of the numerous angling associations which are coming into existence all through the province, the fishermen can be educated from a standpoint of regulations and fish culture to such an extent as to reduce to a minimum the difficulties of the fishery officers.

In addition to the splendid supply of such excellent sporting fish as the steelhead, cutthroat and rainbow trout, and the spring salmon, native to British Columbia, the department has successfully introduced the Atlantic salmon and Eastern Brook trout into the province and is each season by means of fish cultural methods restocking depleted streams and lakes as well as providing supplies of sporting and food fish in waters where none has existed in the past.

## SCIENTIFIC INVESTIGATION

It has been contended that a large proportion of the catch of spring salmon off the west coast of Vancouver island by means of trolling is composed of immature fish and that much damage is being done to the supply by the inten-

sive operations being conducted. In order that the department might have full information on this point an officer was stationed on the west coast of the island during the trolling operations. He kept in close touch with the fishing camps and obtained abundant data in the way of measurements, scales, and other information which has been turned over to the Biological Board for examination and report. If it is found that an undue proportion of the catch is composed of immature fish the necessary action looking to conservation will be taken.

In order to determine the advisability or otherwise of steps being taken to eliminate trout and other predaceous fish from streams and lakes frequented by salmon, two officers of the Biological Board were stationed at Harrison lake from June 7 to September 8 for the purpose of conducting investigations and collecting data. As this and related work is of considerable magnitude more than one season will be required for the purpose of obtaining intelligent information on which safe conclusions can be based.

#### CLEARING OBSTRUCTIONS IN SALMON STREAMS

During the year the Engineering Branch was kept very busy in the work of clearing obstructions to the ascent of salmon in the numerous streams of the province. The principal streams receiving attention were as follows, together with the expenditure in connection with each:—

	\$	cts.
Wakwash river, Owekano lake.....	1,750	00
Markwell river, Owekano lake.....	1,550	00
Schumahawk river, Owekano lake.....	800	00
Yakoun river, Q.C.I.....	4,476	25
Ian river, Q.C.I.....	248	60
Silver creek, vicinity Hope.....	2,419	55
Salmon river, Kamloops.....	1,700	17
Fishermen's river, V.I.....	1,056	01
San Josef river, V.I.....	1,135	15
Bella Bella District:		
McLaughlin creek.....	}	1,365 23
Tinkey creek.....		
Kisimete creek.....		
Howyet creek.....		
Big Qualicum river.....	185	75
French creek.....	416	08
Kakweiken river, head of Thompson Sound.....	294	18
Embley Lagoon.....	168	69
Oyster river.....	113	92
Skutz Falls.....	260	00

Considerable work was also done at the Pemberton hatchery in the way of renewing fences and cribs which had been washed out owing to unusually heavy freshets in the Birkenhead river. The cost of this work was \$3,346.82.

Abundant evidence is available throughout the province to show the desirability of continuing the clearing of obstructions in such streams and many which for several years have been blocked entirely are now being used again extensively by spawning salmon.

During the year 1921, having in view the strictest economy possible, attention was given to sockeye streams only but it has been found absolutely necessary to give more attention to the other varieties of salmon for which the demand is increasing year by year. For this reason the work of clearing obstructions was extended to such points as Queen Charlotte Islands where it is particularly desirable owing to 1922 being the year of the big run of pinks.

*Hells gate, Fraser river.*—Opinions have been expressed recently to the effect that the work done by the department in the way of clearing obstructions to the ascent of salmon at Hells gate on the Fraser river was not efficiently performed and that as a result the salmon are not able to pass this point and ascend to the spawning grounds. Those most capable of judging the conditions are the

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department's own officer with headquarters at Hope and the assistant to the Commissioner of Fisheries at Victoria. These gentlemen have given Hells gate a very great deal of attention since the slide and as a result of their observations state most emphatically that the clearing work was well done and that the bed of the river was certainly restored to the condition obtaining prior to the slide and when the passage was made by such immense quantities of parent salmon. At certain stages of the water even before the slide salmon have always had difficulty in passing this point but it is only a matter of waiting perhaps a few hours or possibly a day or two before the water conditions are suitable and all salmon are able to ascend.

## REVENUE

It has been suggested from time to time that the fees required of the fishing industry in British Columbia are not justified and in connection with the salmon fishing are largely the result of unusually profitable conditions during the war when prices were high and considerable profit was being made. Under present conditions, however, there is no doubt that most of the license fees charged are far too heavy and considerable relief to the industry would result if fees were more of a nominal nature. In view of the huge benefits which result to the country generally from the operations of those engaged in the industry by way of the employment of thousands of individuals, the distributing of millions of dollars each season to fishermen and merchants, and in numerous government taxes, there would seem to be little justification for the continued large license fees.

## MEETINGS WITH INSPECTORS AND OVERSEERS

The usual annual spring meeting with the inspectors of the three districts, together with their overseers, was held in Vancouver and the results obtained were most satisfactory. Each season the benefit of such meetings becomes more apparent and the efficiency of the service is increased.

## BRITISH COLUMBIA FISHERIES COMMISSION

The Fisheries Commission, composed of six members of the Federal House Committee on Marine and Fisheries, spent several weeks on the coast during the late summer investigating the fisheries of the province and on its return to Ottawa submitted to the department an interim report containing certain recommendations which it was considered necessary to make pending the submission of the final report, which it is expected will contain many recommendations which will result in permanent benefit to the fishing industry.

## CONFERENCE WITH ALASKA AUTHORITIES

A considerable portion of the run of salmon heading for the Naas river passes through Alaskan waters and is intercepted by the American traps and other fishing gear. Between the equipment used on the Alaskan side and that used on the Canadian side the result has been over fishing to such an extent that the run of salmon to the Naas river has become to a large extent depleted. The conditions in this respect are very similar to those obtaining on the Fraser river where practically all the run of sockeye salmon in particular passes through American waters before reaching the Fraser.

In March a meeting was arranged with the Secretary of the Alaska Fisheries Commission in Vancouver for the purpose of discussing Naas river conditions with a view to joint regulations looking to the conservation of the runs to the Naas. On the secretary's arrival at Vancouver, however, he was

advised by his department in Washington, D.C., to the effect that according to the then existing law it would not be possible to enter into the necessary arrangement with the Canadian authorities. It is hoped, however, that in the near future further efforts will result in better success.

#### INSPECTION OF SPAWNING AREAS

The usual examination of the salmon spawning beds was made by the fishery officers where practicable and the resultant reports received show that with few exceptions the several areas were plentifully supplied naturally with spawn.

In the Naas river district the supply of sockeye reaching the Meziaden lake showed a great improvement over the last few years, the run of sockeye at least equalling that of the year 1917. An inspection of the Bowser lake district was also made after many difficulties but from the information obtained it would appear that the lake is not particularly valuable from a standpoint of spawning sockeye.

In the Skeena river watershed conditions were found to be eminently satisfactory, the Babine lake and Lakelse lake spawning areas being abundantly seeded with sockeye ova. This also applies to the Kitsumkelum area.

In the Bella Coola and Kimsquit areas the reports show that the spawning grounds received an abundant supply of sockeye eggs. Considerable money has been spent in recent years in this vicinity in the way of clearing obstructions from streams and the result has certainly justified the expense.

In the Rivers inlet district it was found that a satisfactory quantity of spawning sockeye did not reach the streams at the head of Owekano lake but that the remainder of the spawning areas were splendidly seeded. Attention is being given, however, to the first-mentioned streams by means of fish cultural methods and an adequate supply of sockeye salmon eggs and fry is being planted at these points.

Reports from the Smiths inlet district show that satisfactory quantities of sockeye salmon ascended to the spawning areas in that vicinity. The quantities of spring salmon observed in this district is also worthy of note.

On the west coast of Vancouver island the number of parent sockeye salmon reaching the spawning areas at Kennedy lake was very satisfactory and the hatchery situated on the lake was filled to capacity with eggs of the sockeye variety. There was also a good run of sockeye to the Anderson lake and that hatchery was also filled to capacity.

A fairly good run also ascended the Sproat and Stamp rivers.

The reports received from the Fraser river watershed show that compared with recent years a very fair supply of parent sockeye salmon reached the spawning grounds together with an unusually large quantity of spring salmon which ascended in considerable numbers to the head waters of the Fraser and were observed in quantities particularly in the Nechako system and as far up as Tete juan Cache. A few hundred parent sockeye salmon were observed in the Nechako river system.

The Bowron lake and river system showed no improvement over last year when only a few sockeye were observed.

In the Quesnel district the conditions apparently were very similar to those of last year when a certain number of spawning sockeye were observed but the quantity is infinitesimal when compared with runs of previous years when millions were counted.

In the Chilco and Chilcotin districts the reports received would indicate that only a very few sockeye salmon were seen.

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The reports from the Stuart lake district show conditions this year to be very similar to last season. The Indians obtained in the vicinity of 1,500 parent sockeye but owing to there being a considerable amount of work available the fishing operations by the Indians did not assume the same proportions as in previous seasons and it is reasonable to assume that a fair supply compared to the last few years reached the spawning grounds. Undoubtedly the run of spring salmon to the Nechako and Stuart lake systems was the best for a number of years. It has been suggested that this is possibly due to there being considerably less fishing equipment operating in Puget sound during the time spring salmon were passing through on their way to the Fraser.

In the North Thompson river the run of sockeye is reported as being slightly in excess of the last few years. In the South Thompson a good run of sockeye passed up the river and which was reported to have exceeded the run of the previous eight years.

The Shuswap district particularly in the vicinity of Adams river received a greater quantity of sockeye spawn than for the last three seasons.

In the Bridge river district there was again a very splendid run of sockeye. The hatchery was filled to capacity and large quantities of parent fish were permitted to spawn naturally.

In the Harrison lake district the supply of spawning sockeye at Morris creek was considerably in excess of the previous few seasons and the whole run to the Harrison district shows a decided improvement.

The Cultus lake and Chilliwack lake system was plentifully supplied with sockeye, coho, and steelhead eggs.

The run of sockeye to the Pitt lake district was estimated to be at least 25 per cent greater than the runs of recent years. A plentiful supply of spring and coho salmon was also observed.

The spawning areas in the vicinity of Burrard inlet and Howe sound were well supplied with chum salmon but this year is the off one for the pink variety.

## DEPARTMENT OFFICIALS

It is with much pleasure that I refer to the visit of the Superintendent of Fish Culture together with the Fisheries Engineer for the purpose of a thorough inspection of the hatchery service in the province. It is only by such visits made frequently that the proper touch can be maintained and mutual difficulties appreciated.

## STAFF

All members of the staff have had an exceedingly busy year and frequently it is found necessary to remain after hours and for several members of the staff to spend many evenings and Saturday afternoons in the office in order that the work may be kept up. Temporary assistance, which can be obtained from time to time, is mostly unsatisfactory as a considerable portion of the period of employment is consumed in learning the work and as such positions are only temporary there is not the same interest shown as would be the case with a permanent member of the staff.

## OBITUARY

It is with very great regret that I refer to the deaths of Mr. Robert Gold, a member of the staff of the Inspector of District No. 3, at Nanaimo, Mr. D. F. M. Perkins, Fishery Overseer for the Fort George District, Mr. Ernest Parker, deckhand on the F. P. L. *Merrysea*, who was drowned on July 6, 1922, and Mr. John Widsten, Fishery Overseer at Bella Coola, who was killed by a falling tree on December 12, 1922.

## STATEMENT OF SALMON PACK—BRITISH COLUMBIA

WHOLE PROVINCE—1895 TO 1922

STATEMENT No. 1

Year	Number of canneries operated	Sockeye	Red Spring	Pink Spring	White Spring	Bluebacks	Steelheads	Cohoos	Pinks	Chums	Totals
1895	36	Particulars of varieties not available									566,395
1896	47	"									601,570
1897	54	"									1,015,477
1898	51	"									484,161
1899	59	"									732,437
1900	64	"									385,413
1901	73	"									1,236,156
1902	66	531,436									625,982
1903	59	Particulars of varieties not available									473,674
1904	51	323,226									465,894
1905	67	1,080,673	(35,421 Red & Wh. Springs) Fall: 107,247								1,167,460
1906	64	459,679	(28,359 Red & Wh. Springs) 1,083								629,460
1907	58	314,074	23,159	2,939			683	87,900	(118,704	Pinks and Chums)	547,459
1908	52	355,023	25,433	2,731			1,137	81,917	(76,448	"	542,689
1909	72	840,441	18,218	799				61,918	(46,544	"	967,920
1910	58	565,915	19,313	9,476			140	74,382	34,613	58,362	762,201
1911	59	383,509	38,751	9,705				119,802	305,247	91,951	948,965
1912	57	444,762	62,345	18,092				165,309	247,743	58,325	996,576
1913	78	972,178	37,433	3,616				69,822	192,887	77,965	1,333,901
1914	63	536,696	32,908	16,420				120,201	220,340	184,474	1,111,039
1915	63	476,042	36,047	6,370				146,956	367,352	82,000	1,133,381
1916	72	214,789	51,231	15,495			2,927	183,623	280,644	240,201	995,065
1917	94	339,848	48,630	27,646		3,096	B.B. & S.H.)	157,589	496,759	475,273	1,557,485
1918	88	276,459	65,535	(41,819 Pk. & Wh.)		(15,916	B.B. & S.H.)	191,068	527,745	497,615	1,616,157
1919	82	369,445	73,179	18,295		24,323	4,493	175,670	346,639	372,035	1,393,156
1920	65	351,405	95,983	13,877		8,061	2,395	101,972	520,856	84,626	1,187,616
1921	56	163,914	36,725	6,966		7,060	1,220	117,288	192,906	71,408	603,548
1922	64	299,614	21,163	11,913		6,431	1,657	102,845	581,979	258,204	1,290,326

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## PACK OF CANNED SALMON ON THE FRASER RIVER, 1895 TO 1922

STATEMENT No. 2

Year	Number of canneries operated	Number of gill-nets operated	Sockeye	Red Spring	Pink Spring	White Spring	Bluebacks	Steelheads	Cohoos	Pinks	Chums	Totals
1895.....	21	.....	400,368	.....	.....	.....	.....	.....	.....	.....	.....	400,368
1896.....	29	.....	356,984	.....	.....	.....	.....	.....	.....	.....	.....	356,984
1897.....	35	.....	860,459	.....	.....	.....	.....	.....	.....	.....	.....	860,459
1898.....	35	.....	256,101	.....	.....	.....	.....	.....	.....	.....	.....	256,101
1899.....	41	.....	510,383	.....	.....	.....	.....	.....	.....	.....	.....	510,383
1900.....	48	.....	316,522	.....	.....	.....	.....	.....	.....	.....	.....	316,522
1901.....	49	3,832	990,313	.....	.....	.....	.....	.....	.....	.....	.....	990,313
1902.....	42	2,685	293,477	.....	.....	33,618	.....	.....	.....	.....	.....	327,095
1903.....	35	3,101	204,800	(2,084	Red. & Wh. Spring)	.....	.....	.....	25,728	4,504	.....	237,125
1904.....	23	2,224	72,088	(9,482	Red. & Wh. Spring)	.....	.....	.....	45,667	1,066	.....	128,903
1905.....	38	2,770	837,489	(5,507	Red. & Wh. Spring)	.....	.....	.....	30,836	3,304	.....	877,136
1906.....	24	1,746	183,007	6,503	.....	1,020	.....	.....	34,413	(15,543	Pk. and Chums)	240,486
1907.....	18	1,726	59,815	3,448	.....	557	.....	.....	35,766	(63,530	.....	163,116
1908.....	16	1,374	63,126	1,427	.....	18	.....	.....	24,198	( 415	.....	89,184
1909.....	38	2,688	542,248	1,428	.....	.....	.....	.....	21,540	( 1,987	.....	567,203
1910.....	21	1,577	133,045	1,018	.....	8,925	.....	.....	27,855	128	52,177	223,148
1911.....	15	1,306	58,487	7,028	.....	6,751	.....	.....	39,740	142,101	47,237	301,344
1912.....	15	1,430	108,784	14,955	.....	8,373	.....	.....	38,574	12,961	12,961	173,921
1913.....	35	2,560	684,596	3,573	.....	49	.....	.....	11,648	9,973	22,220	732,059
1914.....	20	2,656	185,463	9,485	.....	14,000	.....	.....	38,639	6,057	74,726	328,390
1915.....	22	2,616	89,040	15,388	.....	3,532	.....	31	34,114	128,555	18,539	289,119
1916.....	21	2,240	27,394	11,096	.....	9,217	.....	33	24,580	134,442	30,184	106,440
1917.....	29	2,626	123,614	10,197	.....	18,916	3,096	7	25,895	59,973	59,973	377,988
1918.....	18	1,582	16,849	15,192	579	24,274	4,944	635	40,111	18,388	86,215	206,003
1919.....	14	1,337	29,628	14,519	704	3,592	3,760	328	39,253	39,363	15,718	158,718
1920.....	11	1,288	44,598	19,961	2,188	2,204	15,613	34	22,934	12,839	23,884	132,860
1921.....	13	1,437	35,900	11,360	467	5,480	4,488	8	29,978	8,178	11,223	103,917
1922.....	10	1,296	48,744	10,561	2,433	3,867	1,823	5	23,587	29,578	17,895	137,482

## PACK OF CANNED SALMON ON PUGET SOUND FROM 1887 BY SPECIES

STATEMENT No. 3

Year	Number of canneries operated	Spring	Sockeye	Medium Red	Chum	Pink	Steelhead	Total
1887.....	.....	.....	.....	.....	.....	.....	.....	22,000
1888.....	4	.....	.....	7,480	1,145	.....	.....	21,975
1889.....	2	240	.....	3,000	4,000	2,800	.....	11,874
1890.....	1	1,000	.....	5,869	3,093	5,047	.....	8,000
1891.....	2	382	5,538	7,206	16,180	.....	.....	20,529
1892.....	2	86	2,954	11,812	11,380	17,530	.....	26,426
1893.....	3	1,200	47,852	22,418	22,152	23,043	.....	89,331
1894.....	3	.....	41,781	50,865	38,785	9,049	.....	95,400
1895.....	7	1,542	65,143	82,640	26,550	.....	.....	179,968
1896.....	11	13,495	72,979	98,600	38,400	57,268	.....	195,864
1897.....	12	9,500	312,048	111,387	31,481	.....	.....	404,026
1898.....	18	11,200	252,000	128,200	89,100	252,733	.....	400,200
1899.....	19	24,364	499,646	.....	.....	.....	.....	919,011
1900.....	19	22,350	229,800	.....	.....	.....	.....	469,450
1901.....	.....	.....	.....	85,817	93,492	.....	.....	1,380,590
1902.....	21	30,049	372,301	103,450	12,001	181,236	.....	581,659
1903.....	22	14,500	167,211	118,127	49,656	.....	.....	478,488
1904.....	13	14,441	109,264	79,335	41,057	70,992	.....	291,438
1905.....	24	1,804	825,453	94,497	149,218	.....	.....	1,018,641
1906.....	16	8,139	178,748	119,472	50,249	433,423	.....	430,602
1907.....	14	1,814	93,122	128,922	47,607	6,075	.....	698,080
1908.....	22	95,210	170,951	143,133	53,688	370,993	.....	448,765
1909.....	11	13,019	1,097,804	162,755	146,942	108	.....	1,632,949
1910.....	24	10,064	248,014	256,124	104,321	1,046,992	.....	1,557,029
1911.....	15	21,823	127,761	149,727	60,760	791,886	.....	416,125
1912.....	20	20,252	184,680	61,019	56,225	892	.....	2,588,463
1913.....	22	1,234	1,673,099	151,893	278,801	583,049	.....	792,860
1914.....	31	26,044	385,230	180,783	411,724	1,887	.....	1,269,206
1915.....	41	28,466	64,548	114,276	216,285	1,124,884	.....	707,278
1916.....	32	37,080	84,637	225,860	267,538	6,005	.....	1,921,554
1917.....	45	57,543	411,538	210,883	48,849	421,215	.....	624,198
1918.....	32	63,366	50,723	24,502	30,831	5,076	106	1,295,626
1919.....	35	68,542	64,346	89,412	65,552	2,225	.....	1,166,520
1920.....	11	25,846	62,654	111,771	.....	.....	.....	653,400
1921.....	23	25,567	102,967	.....	.....	.....	.....	248,729
1922.....	16	20,615	48,566	.....	.....	.....	.....	.....

## SESSIONAL PAPER No. 29

STATEMENT No. 4

PACK OF CANNED SALMON ON NAAS RIVER, 1895 TO 1922

Year	Number of canneries operated	Number of gill-nets operated	Sockeye	Red Spring	White Spring	Bluebacks	Steelheads	Cohoos	Pinks	Chums	Totals
1895	.....	.....	Particulars of varieties not available	.....	.....	.....	.....	.....	.....	.....	19,550
1896	.....	.....	"	"	"	.....	.....	.....	.....	.....	14,649
1897	.....	.....	"	"	"	.....	.....	.....	.....	.....	20,847
1898	.....	.....	"	"	"	.....	.....	.....	.....	.....	18,953
1899	.....	.....	"	"	"	.....	.....	.....	.....	.....	19,443
1900	.....	.....	"	"	"	.....	.....	.....	.....	.....	18,238
1901	.....	.....	"	"	"	.....	.....	.....	.....	.....	14,790
1902	2	.....	20,953 (Other varieties:	.....	.....	2,365)	.....	.....	.....	.....	23,318
1903	.....	.....	Particulars of varieties not available	.....	.....	.....	.....	.....	.....	.....	12,100
1904	2	.....	15,000	2,357 (Red and White)	.....	.....	.....	1,697	81	.....	19,085
1905	3	.....	24,462	3,340	63	.....	.....	3,085	1,840	.....	32,725
1906	3	.....	22,166	888	.....	.....	.....	5,997	3,450 (Pinks and Chums)	.....	32,534
1907	3	.....	17,813	1,288	.....	.....	681	6,093	5,957	.....	31,832
1908	3	.....	27,584	3,263	.....	.....	1,101	8,348	6,612	.....	46,908
1909	3	.....	28,246	2,280	.....	.....	.....	6,818	3,589	"	40,990
1910	4	240	30,810	1,238	57	.....	140	6,285	895	351	39,720
1911	3	240	37,327	3,434	325	.....	100	7,842	11,467	5,189	65,684
1912	3	265	36,037	5,710	1,226	.....	.....	12,468	12,476	3,245	71,162
1913	3	265	21,574	2,999	152	.....	.....	9,272	20,539	2,987	53,423
1914	4	265	31,327	2,660	725	.....	.....	9,276	25,333	25,569	94,890
1915	4	265	39,349	3,033	648	.....	113	15,171	34,879	11,076	104,289
1916	4	265	31,411	3,061	784	.....	1,498	19,139	59,593	11,200	126,686
1917	4	265	22,188	3,170	1,326	.....	1,125	22,180	44,568	24,938	119,495
1918	6	265	21,816	2,332	1,820	.....	1,305	17,060	59,206	40,388	143,908
1919	5	300	28,259	2,408	1,166	.....	789	10,900	59,949	24,041	97,512
1920	342	.....	16,740	3,584	1,271	.....	560	3,700	43,151	12,145	81,153
1921	5	338	9,364	1,431	657	.....	413	8,236	29,488	2,176	51,765
1922	5	304	31,277	1,466	596	42	193	3,533	75,687	11,277	124,071

## PACK OF CANNED SALMON, SKEENA RIVER, 1895 TO 1922

STATEMENT No. 5.

Year	No. of Cys.	No. of G.N.	Sockeye	Red Spring	Pink Spring	White Spring	Steel- head	Cohoos	Pinks	Chums	Total
1895.....	7		Particulars of var	ities not av	ailable						67 797
1896.....	8		"	"	"						100 140
1897.....	8		"	"	"						65 905
1898.....	6		"	"	"						81 234
1899.....	7		"	"	"						108 026
1900.....	10		"	"	"						128 529
1901.....	11		"	"	"						126 092
1902.....	10		"	"	"						154 875
1903.....	10		"	"	"						98 669
1904.....	11		93,404	(20,621	Red & White Spr.)			10,315	30,529		154 869
1905.....	12		84,717	(14,598	"			7,247	7,523		114 085
1906.....	14		86,394	20,138	"			16,897	(38,991	Pinks and Chums)	162 420
1907.....	13		108,413	10,378	"			15,247	(25,217	"	159 255
1908.....	13		139,846	13,374	"	468		10,075	(45,404	"	209 177
1909.....	12		87,901	11,727	"	742		12,249	(28,120	"	140 739
1910.....	12		187,246	9,546	"	239		11,551	13,473		222 035
1911.....	12	850	131,066	15,514	"	2,428		23,376	81,956		254,410
1912.....	12	850	92,498	19,332	"	4,501		39,835	97,588	70	254,258
1913.....	13	850	52,927	23,250	"	3,186		18,647	66,045	504	164 055
1914.....	13	850	130,166	11,529	"	211		16,378	71,021	8,329	237 634
1915.....	13	962	116,553	15,069	"	204	1,798	32,190	107,578	5,769	279,161
1916.....	14	868	60,923	18,372	"	2,561	3,743	47,409	73,029	17,121	223,158
1917.....	15	788x	65,760	13,586	"	2,699	1,883	38,456	148,319	21,516	292,219
1918.....	15	889x	123,322	16,013	"	6,828	4,994	38,759	161,727	22,573	374,216
1919.....	14	1,153	184,945	19,661	"	2,656	2,672	36,559	117,303	31,457	398,877
1920.....	15	954	90,869	37,403	"	3,123	1,218	18,068	177,679	3,834	334,392
1921.....	13	1,109	40,018	18,599	"	445	498	45,033	124,457	1,993	234,765
1922.....	15	1,091	97,674	7,576	"	2,654	1,050	14,067	195,580	17,343	335,944

x Approx.

Note: Figures of pack for 1922 approximately.



STATEMENT OF SALMON PACK AT SMITHS INLET, DISTRICT No. 2, FROM 1912 TO 1922

STATEMENT No. 7

Year	No. of canneries operated	No. of Gill-nets operated	Sockeye	Red Spring	White Spring	Blue- backs	Steel heads	Coho	Pinks	Chums	Totals
1912.....	1	.....	16,333	(771 Red 995	and White)	.....	.....	85	2,914	998	21,101
1913.....	1	.....	17,600	.....	.....	.....	.....	48	2,100	2,015	22,848
1914.....	No records	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1915.....	1	available	32,301	Other varieties	.....	292	.....	.....	.....	.....	32,593
1916.....	1	.....	13,256	Other varieties	.....	13,990	.....	.....	.....	.....	27,246
1917.....	1	.....	14,131	Other varieties	.....	4,325	.....	.....	.....	.....	18,456
1918.....	2	115	13,441	Other varieties	.....	10,736	.....	.....	.....	.....	24,177
1919.....	2	115	15,814	Other varieties	.....	13,063	.....	.....	.....	.....	28,867
1920.....	1	147	11,991	(15 Red & Wh.)	.....	.....	.....	14	542	.....	12,562
1921.....	1	173	3,429	44	.....	.....	.....	66	31	.....	3,612
1922.....	1	179	6,515	.....	.....	.....	.....	25	19	.....	6,559

## APPENDIX No. 2

## FINANCIAL STATEMENT, FISHERIES, 1922-23

Vote No.	Service	Appropriation	Expenditure
		\$ cts.	\$ cts.
252	Salaries and disbursements of fishery officers, Fisheries Patrol Service.....	683,000 00	612,861 57
253	Building fishways, etc.....	40,000 00	16,115 99
254	Legal and incidental expenses.....	4,000 00	1,475 97
255	Conservation and development of deep-sea fisheries.....	25,000 00	21,761 65
256	Fisheries Intelligence Bureau.....	2,000 00	1,235 73
257	Inspection of canned and pickled fish.....	21,000 00	20,997 05
258	Fish culture.....	370,000 00	332,329 98
259	Scientific investigations into fisheries.....	15,000 00	3,649 94
260	Marine Biological Board.....	42,000 00	42,000 00
536	Compensations <i>re</i> C.G.S. <i>Givenchy</i> .....	1,198 80	1,192 80
537	International fishing schooner race.....	5,000 00	5,000 00
216	Fisheries Protection Service.....	345,500 00	196,639 25
		1,553,698 80	1,255,259 93
	Civil Government salaries.....	96,100 00	87,296 48
	Contingencies.....	25,000 00	23,579 51
	Fishing bounty.....	160,000 00	157,172 55
		1,834,798 80	1,523,308 47
	Gratuities.....		640 00
	Superannuation No. 4, Retirement Act, 1920.....		1,050 00
563	Cost of Living Bonus.....		58,327 38
577	Reclassification arrears.....		267 05
	Total net expenditure, 1922-23.....		1,583,592 90

## REVENUE COLLECTED, 1922-23

Class	Licenses	Revenue tax	Fines	Sales	Total collected	Amounts refunded	Net revenue
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Licenses, etc.—							
Nova Scotia.....	11,134 56		1,228 00	361 46	12,724 02	12 00	12,712 02
Prince Edward Island.....	4,318 75		1,255 00	237 13	5,810 88	1 00	5,809 88
New Brunswick.....	15,893 32		1,934 50	1,351 99	19,179 81		19,179 81
Ontario.....			5 00	2,014 60	2,019 60		2,019 60
Manitoba.....	11,628 50		176 50	305 49	12,110 49	37 50	12,072 99
Alberta.....	11,817 25		100 00	35 55	11,952 80	5 00	11,947 80
Saskatchewan.....	2,418 00		284 50	202 15	2,904 65		2,904 65
British Columbia.....	149,654 83	63,355 97	7,221 00	3,916 27	224,148 07	491 50	223,656 57
Yukon.....	320 00				320 00		320 00
Totals.....	207,185 21	63,355 97	12,204 50	8,424 64	291,170 32	547 00	290,623 32
Casual.....							5,183 15
Fish culture.....							2,972 98
Modus vivendi licenses.....							3,697 50
Fines and forfeitures.....							1 00
Revenue under Pelagic Sealing Treaty.....							59,876 83
Premiums on exchange.....							467 12
Total net revenue collected, 1922-23.....							362,821 90

## DETAILED STATEMENT OF SALARIES AND DISBURSEMENTS EXPENDITURE, 1922-23

Provinces	Inspector's Overseers and Ward's		Allowances			Gasoline and Oil	Special Guardians		Sundry	Total
	Salaries	Disbs.	Auto	Boat	Horse		Wages	Expenses		
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
<i>Eastern Division—</i>										
General account.....	12,585 00	1,995 13							217 82	
Nova Scotia No. 1.....	11,845 00	3,167 80	3,034 39	581 25	74 20	224 05	13,522 37	83 48	243 21	32,775 75
" No. 2.....	15,300 00	2,863 91	3,566 67	218 75	625 00	169 08	4,794 63	430 63	205 29	28,173 96
" No. 3.....	17,266 93	4,876 90	3,600 00		900 00		3,342 51	30 00	189 49	30,205 83
<i>New Brunswick</i>										
No. 1.....	8,655 00	1,949 65	1,543 00	300 00	267 74	229 29	2,647 00	10 00	105 70	15,707 38
" No. 2.....	15,644 14	3,406 51	3,817 19	615 35	346 43	456 61	9,067 27		929 11	34,282 61
" No. 3.....	6,308 00	1,318 76	3,333 33	75 00	350 00	89 23	6,301 52	3 50	25 97	14,805 31
<i>Prince Ed. Isl.</i>										
No. 1.....	7,104 11	1,875 54	1,451 61	37 50			1,251 00	186 15	734 36	12,640 27
" No. 2.....	2,130 00	888 68		150 00		346 85			11 95	3,527 48
	96,838 18	22,342 88	17,346 19	1,977 85	2,563 37	1,515 11	40,926 30	743 76	2,662 90	186,916 54
<i>Quebec.</i>									134 39	134 39
<i>Central Division—</i>										
General account.....	4,740 00	187 82							31 05	4,958 87
Manitoba.....	6,878 65	3,680 59		157 66	594 74		202 50	123 00	184 86	11,822 00
Saskatchewan.....	8,865 00	3,306 79	112 50	112 50	750 00		252 50	470 30	62 51	13,932 10
Alberta.....	8,546 99	3,527 52	75 00	106 25	350 00		435 00	557 55	92 15	13,690 46
	29,030 64	10,702 72	187 50	376 41	1,694 74		890 00	1,150 85	370 57	44,403 43
<i>British Columbia Division—</i>										
General account.....	18,698 89	1,762 53							4,093 71	24,555 13
British Columbia No. 1.....	9,934 13	8,007 50							814 19	25,964 66
" No. 2.....	11,035 32	3,934 05							378 35	20,845 32
" No. 3.....	14,118 52	6,534 69				148 29	5,175 83	1,108 14	770 47	27,855 94
	53,786 86	20,238 77				148 29	14,856 63	3,059 36	7,131 14	99,221 05
<i>General Account.</i>									15,523 04	15,523 04

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## SUMMARY

Eastern Division.....	96,838 18	22,342 88	17,346 19	1,977 85	2,563 37	1,515 11	40,926 80	743 76	2,662 90	186,916 54
Quebec.....									134 39	134 39
Central Division.....	29,030 64	10,702 72	187 50	376 41	1,694 74		890 00	1,150 85	370 57	44,403 43
British Columbia Division.....	53,786 86	20,238 77				148 29	14,856 63	3,059 36	7,131 14	99,221 05
General Account.....									15,523 04	15,523 04
Totals.....	179,655 68	53,284 37	17,533 69	2,354 26	4,258 11	1,663 40	56,672 93	4,953 97	25,822 04	346,198 45



"Blue Bird"	267 74	56 55	7 15	0 40	83 00	414 84
"Boy Bob"	186 67	175 74	5 20	0 95	61 00	329 56
"Choreboy"	355 88	117 22	27 55		271 00	771 65
"Corycia"	239 57	72 00	14 40	1 60	75 00	402 57
"Dixie"	1,323 55	197 16	46 85	3 13	739 20	2,309 89
"Dustie"	460 00	156 33	11 74	4 83	610 00	1,242 90
"Ethelda"			21 15			21 15
"Evanson"	564 00				39 34	603 34
"Flossie"	80 65	25 85	1 00		25 00	132 50
"Frisbie"	460 00	163 60	11 07	4 83	610 00	1,249 50
"Gene"	900 00	511 54	84 80	6 77	1,404 00	2,907 11
"Grace R."	600 00	126 40	11 00		187 00	924 40
"Hyak"	150 00	32 48	10 71		47 00	240 19
"Inanda"	250 00	11 40	2 00		76 00	339 70
"Iona"	905 00	161 55	38 51	6 91	918 00	2,029 97
"Law"	258 06	51 10	9 55		79 00	397 71
"Mable"	460 00	82 81	17 11		610 00	1,169 92
"Marie S."	1,125 00	230 80	55 09		1,015 00	2,439 72
"Murrette"	1,088 44	766 39	87 09	3 16	1,776 00	3,721 08
"Mystery"	446 67	170 33	15 00		137 00	709 00
"McKenzie"	274 19	67 40	14 45	1 40	84 00	441 44
"Nell"	500 00	48 10	4 50	2 40	155 00	710 00
"Nicolson"	961 29	62 70	11 41		322 80	1,358 20
"Nothalk"	900 00	213 17	45 38	11 18	854 00	2,023 73
"Odessa"	941 49	252 96	13 10	9 00	1,082 65	2,269 20
"Olive"	566 67	79 88	16 26		173 00	835 81
"Owl"	406 33	20 33	5 75	3 16	432 00	867 57
"Oyashimo"	1,075 32	280 71	24 28	8 06	1,429 40	2,817 77
"M"	1,252 58	232 44	27 41		782 34	2,294 77
"Pachena"	1,332 88	754 41	278 40	3 21	2,545 65	4,914 55
"Pioneer"	427 42	46 54	9 60		131 00	614 56
"Red Wing"					20 00	20 00
"Regal R."		321 73	42 47	8 06	340 00	712 28
"Reliance"	241 93	63 83	8 82		197 95	502 53
"Result"	887 09	256 40	31 73	3 12	266 18	1,444 58
"Sulmo"		3 27				3 27
"Seal Cove"	782 42	4 20			1,485 00	2,271 62
"Shushartie"	206 45	33 44	4 85		71 10	315 84
"644"	210 00	58 85	10 60		58 00	337 45
"Sophann"	867 00	232 78	80 64	11 69	1,220 00	2,412 11
"Sophia"	285 16	33 78	7 50		95 92	422 86
"Spruce"	100 16	31 38	3 46	1 84	162 00	298 84
"Stubbs"	300 00	101 87	19 41		92 00	513 28
"Teal"	648 39	31 40	5 00		253 70	938 49
"Ukataw"	900 00	426 63	66 29	8 61	1,220 00	2,621 53
"Velma"	900 00	215 88	8 84	4 82	605 00	1,734 54
"Vera"			11 23			11 23
"We-Two"	611 29	104 73	8 25		182 82	907 09
"Whipp"					16 00	160 00
"W.T."	216 23	47 50			66 00	333 33
"York"	145 16		3 60		16 13	161 29

## DETAILED STATEMENT OF FISHERIES PATROL SERVICE EXPENDITURE, 1922-23—Continued

Establishments and Accounts	Paylist	Board or Prov'n.	Fuel	Repairs		Engine	Supplies		Clothing	Sundry	Total	
	\$ cts.	\$ cts.	\$ cts.	Hull	Engine	\$ cts.	Deck	Stewards	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Departmental Boats—</i>												
"Anina"			159 88	65 94	108 04	36 91	3 75			4 30	378 82	
"Babin No. 1"	786 10		128 04	8 15	20 67	30 50	18 06			9 70	1,001 22	
"Babine No. 2"	772 26		128 04	3 35	39 53	34 35	17 18			12 50	1,007 21	
"Black Raven"	1,857 90		913 14	75 50	358 02	93 03		97 18	1 30	139 87	3,659 43	
"Bonila"	1,517 24		805 61	210 82	475 34	107 17	20 55	48 14		109 71	3,294 58	
"Cohoe"	786 68		458 92	39 09	218 52	106 90	38 15	51 83		156 05	1,856 14	
"Egret"	1,678 00		843 44	157 15	266 50	134 76	37 20	17 02		249 11	3,381 18	
"Elk"	3,395 00		613 85	270 35	97 97	57 09	2 55	38 00	8 97	150 81	4,634 59	
"Fispa"	5,040 57	1,514 92	4,836 63	547 23	1,138 58	510 59	94 52	303 47	62 70	363 63	14,375 84	
"Foam"	5,040 00	14 85	765 65	344 98	223 47	46 54	86 48	45 73	14 52	517 95	7,100 17	
"Givenchy"	26,525 42	6,243 62	8,334 29	1,206 81	4,527 46	1,564 34	913 46	619 71	1,082 77	998 89	52,014 77	
"Gull"	1,260 00		732 30	159 79	396 51	101 20	31 15	97 30		318 05	3,096 30	
"Hawk"	1,553 78		465 04	89 52	73 53	114 60	71 71	25 80		196 13	2,590 11	
"Heron"	1,903 45		802 06	85 26	71 61	77 37	18 13	48 96		116 75	3,183 59	
"Humming Bird"			22 77		5 75					3 20	39 63	
"Kayex"	862 12		345 61	26 53	223 26	151 07	32 15	101 46		43 01	1,785 21	
"Linnet"	1,520 16		419 64	18 00	17 23	54 56	1 85	31 91		43 73	2,107 08	
"Marfish"	6,199 37	1,508 71	1,869 29	1,005 03	766 28	477 85	169 76	331 32	102 03	823 49	13,253 13	
"Merlin"	1,238 87		308 38	12 77	44 81	69 92	25 11	25 38		52 60	1,777 84	
"Merrysea"	4,750 23		1,366 19	138 47	198 60	187 52	18 47	27 94		266 73	6,954 15	
"Parnigan"					5 38					1 25	6 63	
"Semiahmo"	2,107 33		381 38	106 43	68 86	25 74	2 55	14 69		88 11	2,775 09	
"Sean"	5,040 00		948 89	204 93	358 12	69 92	55 41	71 67	17 93	385 43	7,152 30	137,425 01
107,596 40	9,320 45		33,845 66	4,776 10	9,849 59	5,433 49	1,866 56	2,194 96	1,314 39	31,841 44	208,039 04	
General Account											92 83	
SUMMARY												
Eastern Division	22,029 70	43 76	6,356 03	972 86	2,115 73	1,198 50	414 38	411 60	198 17	2,518 02	36,238 75	
Quebec			34 20	310 57	37 18					58 50	440 45	
Central Div.	9,473 33	2,660 01	6,842 79	913 37	179 15	321 94	803 36	180 63	299 18	178 29	21,852 05	
British Columbia Division	107,596 40	9,320 45	33,845 66	4,776 10	9,849 59	5,433 49	1,866 56	2,194 96	1,314 39	31,841 44	208,039 04	
General Account										92 83	92 83	
Totals	139,109 43	12,024 22	47,078 68	6,972 90	12,181 65	6,953 93	3,084 30	2,787 19	1,781 74	34,689 08	266,663 12	

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## DETAILED STATEMENT OF FISH CULTURE EXPENDITURE, 1922-23

Hatcheries	Salaries	Maintenance	Total of hatchery	Total of provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<b>Nova Scotia—</b>				
Bedford.....	1,260 00	3,943 71	5,203 71	
Lindloff.....		468 55	468 55	
Long Beach Pond.....		92 03	92 03	
Margaree.....	3,600 00	5,154 82	8,754 82	
Margaree Pond.....	392 84	2,407 85	2,800 69	
Middleton.....	2,415 00	4,128 00	6,543 00	
Windsor.....	1,320 00	2,216 38	3,536 38	
	8,987 84	18,411 43		27,399 27
<b>Prince Edward Island—</b>				
Kelly's Pond.....	2,505 00	2,296 56		4,801 56
<b>New Brunswick—</b>				
Grand Falls.....	2,430 00	2,267 36	4,697 36	
Miramichi.....	2,394 39	9,148 11	11,542 50	
Miramichi Pond.....		2,107 34	2,107 34	
Nepisiquit.....		425 62	425 62	
New Mills Pond.....	449 50	4,913 12	5,362 62	
Restigouche.....	2,820 00	2,405 09	5,225 09	
Sparkle.....		491 86	491 86	
St. John.....	2,490 00	7,347 98	9,837 98	
St. John Pond.....		10,259 57	10,259 57	
Tobique.....		348 81	348 81	
	10,583 89	39,714 86		50,298 75
<b>Quebec—</b>				
Gaspe.....	705 00	114 53	819 53	
Tadoussac.....	390 00	886 03	1,276 03	
York.....		572 92	572 92	
	1,005 00	1,573 48		2,668 48
<b>Ontario—</b>				
Collingwood.....	3,840 00	8,063 76	11,903 76	
Kenora.....	3,932 44	9,240 57	13,173 01	
Kingsville.....	3,915 00	6,444 07	10,359 07	
Newcastle.....		150 00	150 00	
Port Arthur.....	3,780 00	2,448 30	6,228 30	
Sarnia.....	3,900 00	5,150 36	9,050 36	
Southampton.....	3,573 31	5,910 20	9,483 51	
Thurlow.....	5,325 00	6,596 68	11,921 68	
Warton.....	4,140 00	3,280 47	7,420 47	
	32,405 75	47,284 41		79,690 16
<b>Manitoba—</b>				
Dauphin River.....	1,635 00	6,521 47	8,156 47	
Dauphin River Spawn Camp.....		1,121 96	1,121 96	
Gull Harbour.....	2,580 00	2,015 34	4,595 34	
Winnipegosis.....	2,670 00	14,243 56	16,913 56	
	6,885 00	23,902 33		30,787 33
<b>Alberta—</b>				
Banff.....	2,820 00	3,494 77	6,314 77	
Spray Lakes.....		1,572 55	1,572 55	
	2,820 00	5,067 32		7,887 32
<b>Saskatchewan—</b>				
Qu'Appelle.....	2,415 00	4,137 84		6,552 84

14 GEORGE V, A. 1924

DETAILED STATEMENT OF FISH CULTURE EXPENDITURE, 1922-23—*Concluded*

Hatcheries	Salaries	Maintenance	Total of hatchery	Total of provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>British Columbia—</i>				
Anderson.....	130 00	7,196 62	7,326 62	
Babine.....		8,435 53	8,435 53	
Cowichan.....	356 45	6,523 11	6,879 56	
Cultus.....	70 00	4,980 63	5,050 63	
Gerrard.....	30 00	1,944 62	1,974 62	
Harrison.....	125 63	12,744 22	12,869 85	
Kennedy.....	130 00	7,063 61	7,193 61	
Lloyd's Creek Eyeing St'n.....		1,418 95	1,418 95	
New Westminster.....		49 42	49 42	
Pemberton.....	140 00	14,465 73	14,605 73	
Pitt.....	75 00	4,386 48	4,461 48	
Rivers Inlet.....	115 00	13,541 37	13,656 37	
Skeena.....	199 70	11,939 39	12,139 09	
Stuart.....	120 00	6,772 46	6,892 46	
General.....	6,896 90	3,586 71	10,483 61	
	*8,388 68	105,048 85		113,437 53
<i>General Account.....</i>	4,260 00	4,546 74		8,806 74

## SUMMARY

Nova Scotia.....	8,987 84	18,411 43	27,399 27
Prince Edward Island.....	2,505 00	2,296 56	4,801 56
New Brunswick.....	10,583 89	39,714 86	50,298 75
Quebec.....	1,095 00	1,573 48	2,668 48
Ontario.....	32,405 75	47,284 41	79,690 16
Manitoba.....	6,885 00	23,902 33	30,787 33
Alberta.....	2,820 00	5,067 32	7,887 32
Saskatchewan.....	2,415 00	4,137 84	6,552 84
British Columbia.....	*8,388 68	105,048 85	113,437 53
General Account.....	4,260 00	4,546 74	8,806 74
	80,346 16	251,983 82	332,329 98

\* B.C. Salaries mostly distributed through maintenance.

## SESSIONAL PAPER No. 29

## DETAILED STATEMENT OF FISHERIES PROTECTION SERVICE EXPENDITURE, 1922-23

Establishments and Accounts	Pay-list	Board or Prov'n	Fuel	Repairs		Supplies			Clothing	Sundry		—	Total
				Hull	Engine	Engine	Deck	Stewards		\$	cts.		
<i>General Account.</i>	\$ 52 32											\$	cts.
<i>Eastern Division—</i>													
"Arleux"	18,253 47	3,520 66	7,289 74	546 32	494 90	918 51	2,109 13	404 40	98 03	975 35		34,610 51	
"Arras"	20,516 27	5,461 53	9,562 19	508 66	327 64	827 73	1,660 98	212 92	112 80	558 20		39,748 98	
"Hochelaga"	600 00			14 85		Cr. 2,458 11	Cr. 514 10					Cr. 2,357 31	
"Petrel"							Cr. 117 65					Cr. 117 65	
	39,369 74	8,982 19	16,851 93	1,069 83	822 54	Cr. 711 87	3,138 36	617 32	210 89	1,533 55			71,884 48
<i>Great Lakes—</i>													
"Beccanour"	5,667 20	2,490 22	2,628 62	666 83	247 79	239 77	213 94	82 84		459 51		12,696 72	
"Laviolette"	7,088 16	2,179 65	3,652 98	578 10	71 63	201 39	635 41	79 29	69 00	674 22		15,199 83	
"Lavaltrie"						4 86						4 86	
	12,725 36	4,669 87	6,281 60	1,244 93	319 42	446 02	849 35	162 13	69 00	1,133 73			27,901 41
<i>Western Division—</i>													
"Armentieres"	180 00						10 86			66 49		257 35	
"Estevan"										78 90		78 90	
"Malaspina"	29,987 06	5,355 92	8,917 10	363 37	2,724 30	976 10	974 97	663 38	1,407 28	1,824 12		53,193 60	
"Stadacoona"	480 00					2 32	Cr. 28 49	3 70		17 57		475 10	
"Thiepval"	26,882 63	4,888 65	7,013 91	171 13	140 14	679 52	516 27	504 05	804 06	1,127 44		42,727 80	
	57,529 69	10,244 57	15,931 01	534 50	2,864 44	1,657 94	1,473 61	1,171 13	2,211 34	3,114 52			96,732 75

## SUMMARY

<i>General Account.</i>	52 32												120 61
<i>Eastern Division.</i>	39,369 74	8,982 19	16,851 93	1,069 83	822 54	Cr.	3,138 36	617 32	210 89	1,533 55			71,884 48
<i>Great Lakes.</i>	12,725 36	4,669 87	6,281 60	1,244 93	319 42	446 02	849 35	162 13	69 00	1,133 73			27,901 41
<i>Western Division.</i>	57,529 69	10,244 57	15,931 01	534 50	2,864 44	1,657 94	1,473 61	1,171 13	2,211 34	3,114 52			96,732 75
	109,677 11	23,896 63	39,064 54	2,849 26	4,006 40	1,392 09	5,461 32	1,950 58	2,491 23	5,850 09			196,639 25

## MARINE AND FISHERIES

14 GEORGE V, A. 1924

# SUMMARY STATEMENT OF FISHERIES EXPENDITURE BY PROVINCES FOR FISCAL YEAR 1922-23

[illegible]

## SESSIONAL PAPER No. 29

## APPENDIX No. III.

The following is a statement of the different kinds of licenses issued by the different Inspectors during the 1922-23 season:—

## MAGDALEN ISLANDS, QUEBEC—S. T. GALLANT, Inspector

Kind of Licenses—	Number of Licenses Issued
Lobster fisherman's.....	373
Lobster packing.....	25
Lobster packing extensions.....	19
Smelt fishing.....	9
Spec. fishery for herring trap nets.....	47
Spec. fishery for seine net fishing.....	22
Receipt books.....	
	<hr/> 476

## PRINCE EDWARD ISLAND—S. T. GALLANT, Inspector

Lobster fisherman's.....	1,831
Lobster packing.....	186
Lobster packing extensions.....	110
Fish cannery.....	6
Quahaug fishery.....	2
Trap net.....	4
Smelt gill net.....	284
Smelt bag net.....	221
Oyster fishery.....	241
Receipt books.....	
	<hr/> 2,775

## NOVA SCOTIA DISTRICT No. 1—A. C. MACLEOD, Inspector

Lobster fisherman's.....	2,144
Lobster packing.....	52
Lobster packing extensions.....	43 (1 cancelled)
Fish cannery.....	1
Trap nets.....	47
Special angling permits.....	30
Salmon trap net, pound net or weir.....	134 (2 cancelled)
Salmon gill net or drift net.....	28
Smelt gill net.....	162
Smelt bag net.....	45
Oyster fishery.....	84
Receipt books.....	
	<hr/> 2,727 (2 cancelled)

## NOVA SCOTIA DISTRICT No. 2—D. H. SUTHERLAND, Inspector

Lobster fisherman's.....	3,007
Lobster packing.....	73
Lobster packing extensions.....	61
Fish cannery.....	6
Trap net.....	167
Drag seine.....	179
Salmon net.....	20
Special angling permits.....	21
Shad gill net or drift net.....	20
Salmon trap net, pound net or weir.....	1
Salmon gill net or drift net.....	4
Smelt gill net.....	152
Smelt bag net.....	193
Oyster fishery.....	106
Special lobster pound licenses.....	1
Special lobster pound certificates.....	50
Scallop fishery.....	3
Herring weir.....	21
Receipt books.....	
	<hr/> 3,974

## NOVA SCOTIA, DISTRICT No. 3—H. H. MARSHALL, Inspector

Lobster fisherman's.....	3,480
Lobster packing.....	35
Lobster packing extensions.....	7
Fish cannery.....	10 (1 cancelled)
Trap net.....	216 (1 cancelled)
Special angling permits.....	325 (2 cancelled)
Shad gill net or drift net licenses.....	Nil
Smelt gill net.....	95
Smelt bag net.....	29
Scallop fishery.....	249
N. S. herring weir.....	80
Special lobster pound.....	6
Lobster pound certificates.....	151
Lease of Long Beach pond.....	1
Receipt books.....	
	<hr/> 4,525 (4 cancelled)

## NEW BRUNSWICK, DISTRICT No. 1—J. F. CALDER, Inspector

Lobster fisherman's.....	609
Fish cannery.....	6
Salmon fishery.....	10
Shad gill net or drift net.....	9
Scallop fishery.....	10
Herring weir.....	492 (1 cancelled)
Permits to dig soft shell or long neck clams.....	126
Special lobster pound.....	4
Lobster pound certificates.....	251
Lease of Dark Harbour.....	1
Receipt books.....	
	<hr/> 1,266 (1 cancelled)

## NEW BRUNSWICK, DISTRICT No. 2—R. CROCKER, Inspector

Lobster fisherman's.....	2,000
Lobster packing.....	177
Lobster packing extensions.....	50
Fish cannery.....	1
Quahaug fishery.....	118
Salmon fishery.....	450 (1 cancelled)
Salmon net permits.....	50
Bass gill net.....	Nil
Shad gill net or drift net.....	31
Gaspereau pound net or trap net.....	55
Smelt gill net.....	138
Smelt bag net.....	3,216 (44 free)
Oyster fishery.....	467
Bass fishery.....	62
Herring weirs.....	Nil
Lobster pound licenses.....	2
Lobster pound certificates.....	129
Receipt books.....	
Oyster permits.....	150
	<hr/> 6,917 (1 cancelled, 44 free)

## NEW BRUNSWICK, DISTRICT No. 3—H. E. HARRISON, Inspector

Whitefish fishery.....	10
Salmon fishery.....	112
Salmon net permits for non-tidal waters.....	123
Sturgeon fishery.....	9
Shad gill net or drift net.....	254
Smelt gill net.....	1
Smelt bag net.....	Nil
Bass fishery.....	16
Receipt books.....	
	<hr/> 525

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## MANITOBA—J. B. SKAPTASON, Inspector

Special fishery.....	2,077 (1 cancelled)
Commercial sturgeon.....	134
Domestic sturgeon.....	22
Special angling permits for non-residents.....	22
Settler's permits.....	778
Receipt books.....	2,213 (3 cancelled)

3,033 (1 cancelled)

## SASKATCHEWAN—G. C. MACDONALD, Inspector

Domestic sturgeon.....	8
Commercial sturgeon.....	7
Domestic.....	93 (1 cancelled and 1 free)
Commercial and fisherman's.....	438 (1 free and 1 cancelled)
Indian and half-breed permits.....	483
Receipt books.....	545 (2 cancelled)

1,029 (2 cancelled, 2 free)

## ALBERTA—J. D. WILSON, Inspector

Fish cannery.....	1
Special angling permits.....	4,331 (13 cancelled and 6 free)
Domestic fishery.....	131 (8 cancelled)
Commercial and fisherman's.....	621 (6 cancelled)
Indian and half-breed permits.....	294
Receipt books.....	758

5,378 (27 cancelled and 6 free)

## BRITISH COLUMBIA—J. A. MOTHERWELL, Inspector

Fish cannery.....	36 (1 cancelled)
Special angling permits.....	52
Indian permits.....	174
Abalone fishery.....	2
Crab fishery.....	98
Smelt or sardine.....	50
B.C. gill net, drift net or drag seine licenses operated in conjunction with power boats.....	451 (1 cancelled)
B.C. herring or pilchard gill net or drift net licenses.....	38
B.C. herring drag seine.....	Nil
B.C. herring purse seine.....	30 (1 cancelled)
Herring drag seine or purse seine.....	Nil
Sturgeon fishery.....	3
Salmon trolling.....	1,517 (4 cancelled)
Salmon gill net or drift net.....	4,490 (12 cancelled)
Salmon trap net.....	4
Salmon purse seine.....	148 (6 cancelled)
License to a captain of a salmon purse seine boat, drag seine or herring purse seine.....	139
B.C. salmon drag seine.....	40 (4 cancelled)
Salmon cannery.....	65
Salmon curing.....	63 (2 cancelled)
B.C. license to a person engaged in cold storage or fish packing to buy fresh fish from fishermen.....	126 (1 cancelled)
Reduction works.....	4
B.C. boat licenses to buy salmon from fishermen.....	248
Whale factory licenses.....	3
Salmon curing permits.....	1
Grayfish licenses.....	1
Special seal destruction permits.....	23

7,806 (32 cancelled)

## YUKON TERRITORY

Special fishery.....	21
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21

## MODUS VIVENDI LICENSES

Atlantic coast.....	91
Pacific coast.....	148

239

Total number issued.....40,090 (70 cancelled and 52 free)

## APPENDIX No. IV.

LIST of United States Fishing vessels which entered Canadian ports on the Atlantic Coast during the year ended December 31, 1922.

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed ewt.
Acushla.....	70	23	12	Bait, repairs, supplies, shelter, tranship fish.	
Aeolus.....	16	8	6	Supplies, shelter, land sick man.	
Agnes.....	65	19	4	Shelter.	
Alice Velicia.....	16	10	1	"	
Alice & Wilson.....	16	10	8	" , ice.	
Allen C.....	15	3	1	"	
American.....	93	23	8	Ice, bait, shelter.	
Angeline C. Nunan.....	58	21	3	Shelter.	
A. Pratt Andrew.....	33	6	1	Ice.	
Arthur James.....	95	21	1	Shelter.	
Audrey & Theo.....	15	6	1	" , tranship fish.	
Avalon.....	69	21	11	Bait, land fish, oil, ice, repairs, shelter, supplies.	37
Aviator.....	210	9	1	Shelter.	
Bay State.....	81	25	8	Ice, repairs, bait, shelter.	
Benjamin A. Smith.....	75	25	11	Ice, supplies, shelter, bait.	
Benjamin M. Wallace.....	49	19	1	Shelter.	
Bettina.....	66	17	5	"	
Catherine.....	77	27	8	Ice, shelter, bait, repairs, dories.	
Catherine Burke.....	68	19	22	Shelter, bait.	
Cavalier.....	96	22	6	Supplies, to ship men, bait.	
Commonwealth.....	93	25	4	Shelter.	
Constellation.....	87	19	11	" , bait.	
Corinthian.....	97	25	12	Bait, land fish, oil, repairs, shelter.	93
Dawn.....	79	25	4	Shelter.	
Edith C. Rose.....	70	23	5	Repairs, supplies, shelter, to ship men	
Edith Silveria.....	47	19	5	Land sick man, food, shelter.	
Eleanor.....	36	9	3	Coal, shelter.	
Elizabeth Howard.....	90	23	7	Bait, supplies, shelter.	
Elizabeth M. King.....	13	8	2	Shelter, tranship fish.	
Elizabeth W. Nunan.....	48	17	5	Shelter, repairs.	
Elk.....	66	19	9	Bait, oil, supplies, shelter.	
Elmer E. Gray.....	71	21	23	Bait, ice, repairs, shelter, supplies.	
Elsie G. Silva.....	50	21	5	Ice, supplies, shelter, tranship fish.	
Elsie.....	98	25	2	Shelter, to ship crew, water.	
Ellen T. Marshall.....	75	21	6	" , supplies.	
Evelyn & Ralph.....	16	16	12	" , landing fish.	
Fannie E. Prescott.....	74	19	5	Bait, ice, oil, supplies.	
Flor Del Mar.....	55	7	1	Shelter.	
Flora L. Oliver.....	59	21	9	Bait, repairs, shelter, supplies.	
Frances S. Grueby.....	94	25	4	Bait, ice, shelter.	
Frank S. Pierce.....	12	7	3	Shelter, supplies.	
Funchal.....	20	11	1	Shelter.	
Gaspe.....	176	10	1	"	
Gertrude de Costa.....	61	19	2	Repairs, shelter.	
Glover.....	58	25	1	Shelter.	
Governor Foss.....	88	23	4	"	
Governor Marshall.....	60	23	22	Bait, ice, land fish, shipping seamen, supplies, repairs.	71
Good Luck.....	55	19	17	Shelter, tranship fish.	
Grace Darling.....	43	15	3	"	
Harmony.....	66	18	10	" , bait.	
Harvard.....	72	19	3	"	
Hazel R. Hines.....	79	16	3	To ship men, ice, supplies.	
Helena.....	40	17	5	Shelter.	
Helja Silva.....	77	20	4	"	
Henrietta.....	62	19	2	"	
Henry Ford.....	90	25	7	Bait, dories, ice, shelter, supplies.	
Herbert Parker.....	78	23	13	Bait, shelter, supplies.	
Hesperus.....	79	25	12	Bait, land fish, repairs, shelter, supplies.	70

## SESSIONAL PAPER No. 29

LIST of United States Fishing vessels which entered Canadian ports on the Atlantic Coast during the year ended December 31, 1922—*Con.*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed cwt.
Hope Leslie.....	19	13	8	Bait, repairs, shelter, supplies.....	
Hortense.....	43	19	5	Ice, shelter.....	
Imperator.....	79	23	11	Bait, ice, land fish, shelter, supplies, tranship fish.....	70
Ingomar.....	85	20	3	Landing seaman's corpse, shelter, supplies.....	
Jeanette.....	51	19	1	Bait, ice, shelter, supplies.....	
Joffre.....	80	25	4	".....	
John J. Fallon.....	60	19	5	Shelter.....	
John J. Taylor.....	60	19	1	".....	
Joseph Warner.....	28	7	1	".....	
Joseph Warner.....	11	7	6	Ice, shelter.....	
Killarney.....	73	21	6	Bait, ice, shelter, landing sick man.....	
L. A. Dunton.....	94	24	3	" , landing fish, shelter, supplies.....	112
Lark.....	121	23	1	Shelter.....	
Laura Enos.....	17	5	9	Ice, shelter.....	
Laura Goulart.....	73	21	1	Repairs.....	
Leonora Silveria.....	51	20	2	Shelter.....	
Leslie.....	20	6	3	Ice, shelter.....	
Lois Coln.....	12	9	4	".....	
Lois H. Corkum.....	34	12	12	Salt, shelter, supplies, repairs, land fish.....	55
Louis Enos.....	9	5	1	Shelter.....	
Louisa B. Marshall.....	74	21	3	Bait, shelter.....	
Louisa R. Sylva.....	92	23	13	Bait, ice, shipping men, shelter, supplies.....	
Lucia.....	43	17	6	Shelter.....	
Margaret.....	72	19	1	".....	
Margaret.....	62	19	1	".....	
Marion McLoon.....	11	7	9	" , supplies.....	
Marshall Foch.....	64	23	10	Bait, ice, repairs, supplies.....	
Mary de Costa.....	62	19	2	Shelter, landing fish.....	250
Mary E. O'Hara.....	49	24	8	".....	
Mary F. Curtis.....	65	23	34	Bait, ice, salt, shipped men, shelter, supplies.....	
Mary T. Fallon.....	48	16	6	Shelter.....	
Mayflower.....	113	25	12	Bait, ice, shelter, supplies.....	
Medric.....	159	21	1	Repairs.....	
Medric.....	11	6	1	Shelter.....	
Melta Comet.....	22	6	3	Land fish, shelter.....	55
Mildred Robinson.....	73	21	4	Bait, repairs, land fish.....	32
Minerva.....	13	6	8	Ice, shelter, supplies.....	
Monarch.....	83	25	15	Bait, ice, shelter, ship men, supplies.....	
Natalie Hammond.....	51	21	6	Repairs, shelter, ship men.....	
Nickerson.....	23	10	6	Shelter.....	
Nirvana.....	50	12	4	".....	
Nyoda.....	28	12	4	".....	
Oretha F. Spinney.....	87	24	4	Bait, land fish.....	66
Orion.....	39	14	3	Repairs, shelter.....	
Osion.....	73	14	1	Shelter.....	
Patriot.....	12	8	1	".....	
Philip P. Manta.....	43	19	9	".....	
Pilgrim.....	63	18	3	Bait, land fish, shelter.....	2
Pilot.....	18	8	1	Shelter.....	
Pioneer.....	128	19	1	Land sick seaman.....	
Pioneer.....	53	19	8	Shelter.....	
Plover.....	208	21	1	Repairs.....	
Progress.....	61	23	1	Dories.....	
Puritan.....	96	24	2	Bait, ice.....	
Republic.....	48	22	6	Bait, ice, land fish, supplies.....	108
Restless.....	35	8	4	Shelter.....	
Restless.....	15	8	1	".....	
Rex.....	75	23	15	Bait, ice, land sick man, land fish, shelter, supplies.....	132
Rhodora.....	70	19	1	Shelter.....	
Ripple.....	96	24	2	Ice, supplies, water.....	
Robert & Arthur.....	67	23	6	Land fish, shelter.....	500
Ruth.....	49	18	4	Shelter, water.....	
Ruth & Margaret.....	78	23	7	Ice, land fish, supplies.....	21

14 GEORGE V, A. 1924

LIST of United States Fishing vessels which entered Canadian ports on the Atlantic Coast during the year ended December 31, 1922—*Con.*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed cwt.
Sadie M. Nunan.....	36	20	6	Shelter.....	
Sibyl.....	18	8	5	Land fish, shelter.....	7
Snipe.....	208	21	3	Repairs.....	
Stiletto.....	91	20	17	Bait, shelter.....	
Sunapee.....	18	9	3	Shelter.....	
Surf.....	119	25	4	".....	
Teazer.....	59	21	9	Land fish, shelter, ship men.....	92
Thelma.....	28	12	3	Shelter.....	
Thomas S. Gorton.....	92	25	8	Bait, ice, repairs, shelter, ship men. supplies.....	
T. M. Nicholson.....	90	23	4	Bait, repairs, shelter.....	
Verna G.....	12	7	2	Shelter, tranship fish.....	
Vida M. McKeown.....	83	19	1	".....	
Waldo L. Stream.....	66	21	1	Repairs.....	
Waltham.....	44	22	4	Shelter.....	
Wesley W. Sennet.....	11	6	4	Ice, shelter, supplies.....	
Yankee.....	96	25	2	Shelter.....	

LIST of United States Fishing vessels which entered Canadian ports on the Pacific Coast during the year ended December 31, 1922.

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed cwt.
A.K.....	7	2	1	Bait.....	
Active.....	4	2	1	".....	
Actor.....	7	2	2	" , land fish.....	20
Adele.....	3	2	1	".....	
Adeline.....	6	2	1	Land fish.....	760
Advance.....	4	3	10	Bait, landing fish, shelter.....	87
Agnes.....	17	5	3	" , shelter.....	
Alaska.....	44	13	1	For orders.....	
Alawa.....	4	2	1	Land fish.....	20
Albatross.....	40	13	9	Bait, land fish, shelter.....	1,487
Alf.....	28	4	1	Land fish.....	2,720
Alfa.....	12	5	5	Bait.....	
Alice B.....	13	5	13	" , land fish.....	80
Alpha.....	3	3	1	Land fish.....	140
Alten.....	43	16	6	Bait, land fish, for orders.....	7,540
America.....	25	11	11	Bait.....	
America.....	11	4	1	Land fish.....	460
Amunsden.....	16	6	1	Bait.....	
Annie.....	11	4	1	Land fish.....	460
Anna J.....	22	6	1	".....	3,080
Anna J. Larsen.....	25	11	5	Bait.....	
Anita Phillips.....	14	2	1	Shelter.....	
Antler.....	22	5	10	Bait, land fish, for orders.....	120
Antler.....	13	4	1	" ".....	340
Arcade.....	14	4	12	" ".....	2,540
Arctic.....	29	11	1	Land fish.....	40
Arctic.....	4	3	1	".....	40
Arthur.....	3	1	1	".....	40
Atlantic.....	25	11	3	Bait, land fish.....	2,580
Atlas.....	31	8	2	" ".....	840
August.....	16	3	2	For orders, shelter.....	
Augusta.....	19	4	1	Land fish.....	1,660
Aurora.....	13	5	10	" , bait.....	300
Baltic.....	20	5	1	".....	540
Bartolome.....	4	3	1	".....	1,040
Beaver.....	17	5	14	" , bait.....	240
Bernice A.....	30	6	1	".....	500
Betty.....	14	5	1	".....	260

## SESSIONAL PAPER No. 29

LIST of United States Fishing vessels which entered Canadian ports on the Pacific Coast during the year ended December 31, 1922—*Con.*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
					cwt.
Bluebird.....	4	1	1	"	40
Bob. F. 857 L.....	1	2	2	Unknown.....	
Bravo.....	4	2	1	"	
Bring Gold.....	12	5	1	Land fish.....	1,200
Brothers.....	13	5	1	"	2,060
Bryan.....	15	4	1	"	360
Burnett.....	30	3	1	"	400
Cal. C. 834.....	3	3	2	Shelter, unknown.....	
California.....	20	5	4	Bait, land fish.....	560
Cape Clear.....	13	4	7	"	440
Carolan.....	18	6	1	Land fish.....	640
Caroline.....	5	2	1	Shelter.....	
Castor.....	6	2	1	"	
Cedric.....	19	5	2	For orders, land fish.....	540
Chancellor.....	13	5	6	Land fish, shelter, bait.....	840
Chimera.....	9	3	16	Shelter, bait.....	
Christine.....	4	1	1	Unknown.....	
Cito.....	4	2	1	"	
Clara.....	4	2	1	Land fish.....	180
Clarion.....	15	3	1	Under seizure.....	
Commonwealth.....	60	15	1	Land fish.....	1,800
Companion.....	30	4	1	"	1,820
Condor.....	4	2	1	"	40
Confidence.....	22	3	1	"	40
Constitution.....	39	13	3	" , bait, for orders.....	1,180
Convention.....	20	5	8	"	560
Cora.....	4	3	1	"	360
Corona.....	19	6	5	" , bait.....	320
Crescent.....	8	4	4	" , shelter, supplies.....	1,040
Dagney.....	4	3	1	"	60
Daily.....	26	6	1	"	2,540
Daisy.....	18	6	1	"	120
Defense.....	20	5	6	" , bait.....	960
Democrat.....	27	6	1	"	1,560
Dependent.....	4	3	1	"	100
Dewage.....	4	1	1	Shelter.....	
Diamond T.....	8	2	1	Land fish.....	2,340
Dip.....	4	1	3	Unknown, land fish.....	6
Discovery.....	10	4	13	Land fish, bait, unknown.....	80
Dolphin.....	5	2	1	Unknown.....	
Dora H.....	15	5	7	Bait, land fish, unknown.....	25
Eagle.....	27	5	1	Land fish.....	1,160
Eagle.....	15	6	1	"	520
Eastern Point.....	4	3	1	"	880
Eidsvold.....	15	5	9	" , bait.....	1,160
Eleanora.....	16	5	5	Bait.....	
Elfin.....	4	3	1	Land fish.....	60
Elsie.....	14	5	1	"	120
Elliott.....	28	8	1	"	260
Emma.....	4	4	1	"	60
Emblem.....	4	2	1	"	360
E. Neilson.....	15	4	1	"	1,200
Enterprise.....	7	3	13	Bait.....	
Eureka.....	4	2	1	Land fish.....	60
Evolution.....	17	9	9	" , bait.....	180
Fairway.....	19	5	5	"	1,460
Faith.....	7	3	4	Bait.....	
F. C. Hergert.....	15	5	9	Land fish, bait.....	320
Fisher.....	14	5	1	"	180
Flamingo.....	13	5	7	Bait.....	
Flattery.....	10	3	1	Land fish.....	560
Flora & Margaret.....	15	5	9	" , bait, for orders.....	920
Florence.....	38	11	1	"	460
Fortuna.....	21	8	11	Bait, land fish.....	100
Fortuna.....	15	5	1	"	
Forward.....	18	4	2	" , land fish.....	2,460
Frane.....	4	3	1	Land fish.....	660
Fremont.....	10	5	8	" , shelter.....	280
G. A. 331.....	2	1	1	Unknown.....	

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LIST of United States Fishing vessels which entered Canadian ports on the Pacific Coast during the year ended December 31, 1922—*Con.*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed cwt.
George B.....	34	8	1	Shelter.....	
Get the Hook.....	10	1	1	".....	
Glacier.....	12	4	1	Land fish.....	920
Gladstone.....	23	7	1	".....	1,400
Gony.....	12	2	2	Bait.....	
Grant.....	5	5	1	Land fish.....	100
Grayling.....	16	5	5	" , bait.....	1,280
Groth.....	7	3	1	".....	920
Hanna.....	11	3	1	Shelter.....	
Happy.....	12	4	1	Land fish.....	1,380
Harding.....	28	5	1	Bait.....	
Harding.....	19	5	13	Land fish, bait.....	400
Harding.....	15	4	1	".....	100
Harvestor.....	15	5	3	" , bait.....	40
Hazel.....	7	4	1	".....	380
Hazel H.....	21	5	10	" , bait.....	160
Helen D.....	8	3	1	".....	100
Helgeland.....	56	15	1	".....	3,460
Herbert B.....	13	7	1	".....	20
Hiawatha.....	6	3	2	Shelter.....	
Hi Gill.....	11	4	1	Land fish.....	400
Hilda.....	10	3	6	" , shelter.....	177
I. K. L.....	7	2	2	Bait, unknown.....	
Imperial.....	19	5	3	Land fish.....	440
I. X. L.....	7	2	1	Unknown.....	
Jean.....	9	2	1	Bait.....	
Jennie F. Decker.....	16	8	8	" , land fish.....	13
Johannah.....	16	5	1	Land fish.....	360
J. P. Todd 1.....	4	2	1	".....	580
June.....	15	5	1	".....	1,060
June F. 643.....	4	2	11	" , bait, unknown.....	35
K. 377.....	4	2	1	".....	220
Katella.....	16	5	9	" , bait.....	140
Kayak.....	8	3	1	Bait.....	
Kennebec.....	13	3	1	Land fish.....	80
Kodiak.....	38	13	7	" , bait.....	1,920
Lady Luck.....	9	4	1	Shelter.....	
Lancing.....	16	4	1	Land fish.....	1,100
La Paloma.....	14	11	11	" , bait.....	380
Laura.....	7	3	3	".....	80
Lebanon.....	14	5	11	" , for orders.....	160
Leif II.....	21	3	1	".....	2,140
Lenor.....	14	4	1	".....	1,400
Liberty.....	44	15	10	" , bait, for orders.....	2,820
Liberty.....	4	2	1	Bait.....	
Lincoln.....	23	5	3	" , land fish.....	780
Lincoln.....	4	3	1	Land fish.....	640
Louise.....	16	6	1	Bait.....	
Lovera.....	4	2	1	Land fish.....	40
Lummen.....	10	4	1	".....	540
Madeline J.....	21	5	10	Bait.....	
Margaret T.....	10	3	1	Land fish.....	100
Mars.....	9	4	1	".....	980
Mary.....	16	8	17	Bait, tried to sell fish.....	
Mary K.....	7	1	1	Supplies.....	
Mary L.....	7	2	1	Bait.....	
Mermaid.....	19	5	10	" , for orders, land fish.....	140
M. Grant.....	5	3	1	".....	
Mildred.....	19	8	7	".....	
Mildred II.....	31	8	8	Land fish.....	640
Mira.....	7	3	1	".....	1,100
Mobile.....	4	2	1	".....	20
Molde.....	7	3	1	".....	20
Morengen.....	17	5	1	".....	1,420
Myrtle.....	9	4	7	Bait.....	
National.....	20	5	6	" , land fish.....	900
Neptune.....	6	2	1	Land fish.....	360
Nielaros.....	13	5	1	".....	400
Nomad.....	15	5	8	" , bait.....	220
Norma.....	6	3	1	".....	680

## SESSIONAL PAPER No. 29

LIST of United States Fishing vessels which entered Canadian ports on the Pacific Coast during the year ended December 31, 1922—*Con.*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Nornen.....	6	3	1	"	cwt. 80
Norland.....	19	5	1	"	1,540
North.....	9	4	11	" , bait, for orders	160
North Pole.....	5	2	1	"	140
Nuzon.....	19	2	1	Shelter	
O. K.....	7	1	1	Bait.....	
Oak Leaf.....	5	2	1	Land fish.....	220
Ocean Queen.....	24	4	1	Bait.....	
Olympic.....	30	11	2	"	
Omaney.....	34	13	1	Land, fish.....	3,080
Onah.....	18	5	8	" , bait.....	760
Orient.....	60	11	1	Shelter.....	
Orient.....	48	13	4	Land fish, bait.....	800
Panama.....	34	13	2	" "	4,240
Pauline J.....	16	4	1	Bait.....	
Peggy.....	5	3	1	Land fish.....	80
Pelican.....	17	5	1	"	1,240
Pershing.....	18	5	11	" , bait.....	40
Petrel.....	67	7	1	Shelter.....	
Phoenix.....	15	2	1	Land fish.....	1,040
Pioneer.....	48	13	1	"	4,460
Pioneer III.....	26	5	11	" , bait, unknown.....	480
Polaris.....	45	15	2	" "	2,660
President.....	24	6	2	"	1,240
Presto.....	14	5	1	Bait.....	
Primrose.....	3	1	1	"	
Rainier.....	4	3	1	Land fish.....	200
Rambler.....	10	3	1	Bait.....	
Raven.....	6	3	1	Land fish.....	100
Reform.....	4	3	1	"	180
Regal.....	13	2	1	Bait.....	
Reliance.....	14	3	1	Land fish.....	960
Reliance.....	7	3	5	" , bait.....	660
Reliance L.....	19	5	1	"	2,000
Republic.....	57	15	1	Shelter.....	
Republic.....	51	15	1	Land fish.....	6,460
Rescue.....	6	4	1	"	40
Restitution.....	24	5	7	" , bait.....	480
Rival.....	4	3	1	"	340
Roald.....	12	3	5	Bait.....	
Roald Amunsden.....	16	6	1	Land fish.....	1,400
Rolle.....	10	5	1	"	120
Rosario.....	16	6	6	Bait.....	
Royal.....	15	5	2	" , land fish.....	600
Roosevelt.....	13	5	7	"	
Ruth.....	4	2	1	"	
Sadie K.....	13	5	3	" , land fish.....	240
Sammy.....	8	3	7	"	
Samson.....	7	3	1	Land fish.....	660
Scandia.....	79	13	1	"	4,340
Scout.....	4	2	1	"	220
Seattle.....	55	15	2	" , bait.....	2,740
Semtor.....	11	6	1	"	1,840
Sentinel.....	21	6	2	" , bait.....	920
Seymour.....	44	15	1	Shelter.....	
Sherman.....	18	5	1	Land fish.....	2,020
Sidney.....	6	3	1	Shelter.....	
Sigmul.....	13	4	1	Land fish.....	100
Silom.....	16	8	14	Bait.....	
Sirius.....	21	5	1	Land fish.....	360
Sitka.....	50	15	1	"	640
Snooks.....	5	1	1	Shelter.....	
Spencer.....	17	5	1	Land fish.....	340
S. & S.....	4	2	1	"	100
Stanley.....	15	3	1	"	420
Star.....	7	3	4	" , bait.....	1,380
Success.....	4	3	1	"	300
Summer.....	34	15	1	"	3,340
Sun Wing.....	15	4	1	"	160
Superior.....	16	5	8	Bait.....	

LIST of United States Fishing vessels which entered Canadian ports on the Pacific Coast during the year ended December 31, 1922—*Con.*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
					cwt.
Superior.....	10	5	1	"	
Swift.....	7	2	2	"	
T. 469.....	5	3	1	Land fish.....	80
T. 603.....	4	3	1	"	100
T. 981.....	5	1	1	Shelter.....	
Tahoma.....	18	11	5	Land fish, bait.....	3,080
Tatoosh.....	24	6	2	"	2,480
Teddy J.....	13	4	1	"	1,500
Texas.....	16	5	10	" , bait.....	180
Thelma II.....	26	5	6	"	520
Thor.....	4	2	1	"	40
Tillicum.....	21	5	4	" , bait, for orders.....	2,400
Tom & Al.....	57	15	3	"	2,900
Topsy.....	3	1	1	Shelter.....	
Tordenskjold.....	39	13	5	Land fish, bait.....	2,880
Tot 363 L.....	2	1	2	Unknown.....	
Tyee.....	12	4	1	Land fish.....	440
W. 221.....	4	2	1	Shelter.....	
Unimak.....	10	3	1	Land fish.....	580
Uramus.....	15	5	5	" , bait.....	660
Valid.....	8	3	6	"	320
Valid.....	4	3	1	Bait.....	
Valera.....	6	3	8	"	
Valorous.....	22	5	1	Land fish.....	220
Vamoose.....	16	1	1	Shelter.....	
Vansee.....	43	15	1	Land fish.....	3,840
Veba.....	6	2	1	Bait.....	
Venus.....	4	3	1	Land fish.....	1,240
Vesta.....	13	4	1	"	1,300
Victor.....	2	2	1	Unknown.....	
Viking.....	11	3	1	Land fish.....	920
Viking.....	6	3	1	"	240
Virginia.....	33	5	2	" , supplies.....	1,240
Vivian.....	9	3	1	"	660
Volunteer.....	21	5	3	" , bait.....	840
Volunteer.....	19	5	8	Bait.....	
Wabash.....	6	3	1	Land fish.....	680
Washington.....	24	8	1	"	600
Washington.....	15	5	4	" , bait.....	360
Wave.....	7	3	1	"	260
Westener.....	4	2	1	Shelter.....	
Westford.....	17	5	6	Land fish, bait.....	800
Westford.....	25	5	1	Bait.....	
White Star.....	17	5	2	" land fish.....	680
Wild Rose.....	4	2	1	Land fish.....	40
Wilhelmina.....	17	5	9	Bait.....	
Wilson.....	19	5	8	" land fish.....	140
William D. Muir.....	65	13	1	Shelter.....	
Wireless.....	19	5	9	Land fish, bait.....	40
Woodrow.....	23	5	4	"	420
Yakutat.....	41	13	9	" , for orders.....	1,600
Yaukee.....	10	3	1	"	140
Yellowstone.....	22	5	2	" , bait.....	800

FIFTY-SEVENTH

ANNUAL REPORT

OF THE

FISHERIES BRANCH

Department of Marine and Fisheries

---

FOR THE YEAR

1923-24

PRINTED BY ORDER OF PARLIAMENT



OTTAWA  
F. A. ACLAND, PRINTER  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
1924

[No. 29—1925] Price, 25 Cents



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1923/24

STATION

*To General His Excellency the Right Honourable Lord Byng of Vimy, G.C.B.,  
G.C.M.G., M.V.O., Governor General and Commander in Chief of the  
Dominion of Canada.*

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of Your Excellency and the Parliament of Canada, the fifty-seventh annual report of the Fisheries Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

P. J. A. CARDIN,

*Minister of Marine and Fisheries.*

DEPARTMENT OF MARINE AND FISHERIES,  
OTTAWA, AUGUST, 1924.

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## DEPUTY MINISTER'S REPORT

To the Hon. P. J. A. CARDIN,  
Minister of Marine and Fisheries.

SIR,—I have the honour to submit the Fifty-seventh Annual Report of the Fisheries Branch of the Department, which is for the fiscal year ended March 31, 1924.

The report deals with the following subjects:—

- Review of the Fisheries of 1923.
- Operation of the Fish Inspection Act.
- Operation of the Meat and Canned Foods Act.
- Fisheries Intelligence Service.
- Fish Publicity Campaign.
- Fishing Bounty.
- Fish Culture.
- Work of the Biological Stations.
- Educational Effort.
- Natural History Observations.

Appendices to the report include the following:—

- Reports of Inspectors of Fisheries.
- Fisheries Expenditure and Revenue.
- Fishways and Removal of Obstructions.
- Work of C.G.S. *Arleux* and *Arras*.
- Summary of Licenses issued.
- Entries of United States Fishing Vessels.

### REVIEW OF THE FISHERIES OF 1923

The catch of fish on both the Atlantic and Pacific coasts during the year was slightly less than in the previous year, while the production for Ontario and the West is slightly higher. The total marketed value of the fisheries of Canada for the year was about three quarters of a million dollars greater than in 1922.

The following table shows the marketed value of the fisheries, by provinces, compared with that of the preceding year:—

	1923	1922
Nova Scotia.....	\$ 8,448,385	\$ 10,209,258
New Brunswick.....	4,548,535	4,685,660
Prince Edward Island.....	1,754,980	1,612,599
Quebec.....	2,100,412	2,089,414
Ontario.....	3,159,427	2,858,122
Manitoba.....	1,020,595	908,816
Saskatchewan.....	256,643	245,337
Alberta.....	438,737	331,239
British Columbia.....	20,795,914	18,849,658
Yukon Territory.....	11,917	10,107
	<hr/>	<hr/>
	\$ 42,565,545	\$ 41,800,210

## ATLANTIC FISHERIES

*Cod, Haddock, Hake and Pollock.*—There were 2,242,000 cwts. of these fish landed during the year compared with 3,045,000 cwts. in the preceding year. A decrease in the catch of cod accounts chiefly for the difference. There were 1,773,000 cwts. of cod landed, which is 547,000 cwts. less than in the year previous. There was a curtailment in the Lunenburg fishing fleet, only eighty vessels operating, which is the smallest number for twenty years and nineteen less than in 1922. The catch of haddock was about the same as in the previous year. Only 93,000 cwts. of hake and 71,000 cwts. of pollock were landed. These are decreases of 169,000 cwts. and 83,000 cwts. respectively from the landings of the year before.

*Mackerel, Herring and Sardines.*—There was a decrease of these fish of 410,000 cwts. in the catch, only 1,102,000 cwts. being taken. The quantity of herring taken was 691,000 cwts., which was 80,000 cwts. less than the year before. Pickled herring reached a very low value, selling for \$4 per barrel. The smoked herring business at Grand Manan was a failure owing to few herring suitable for smoking being taken at the weirs. It would seem that while herring of a suitable size for smoking were plentiful outside in the waters of the bay they were not driven into the weirs by their natural enemies, as is usually the case.

The mackerel catch decreased from 251,000 cwts. in 1922 to 142,000 cwts. The spring run of these fish was small and prices were low, the latter being due to the fact that there was a heavy run off the New England shore and a number of dealers had large stocks in cold storage from the 1922 run, for which a high price had been paid. Conditions, however, improved somewhat towards the end of the year.

The sardine catch shows a decrease. There were 135,000 barrels taken compared with 245,000 barrels in 1922. Owing to the scarcity of these fish the price increased considerably and the sardine fishermen were much better off than for some seasons.

*Other Sea Fish.*—The quantity of halibut decreased by 11,000 cwts., only 20,000 cwts. being taken. Swordfish were landed in larger numbers, the catch being 14,000 cwts. Albacore and flounders show increased catches, but there was a decrease in the catch of tomcod.

*Shellfish.*—The lobster season opened under very bad conditions, the drift ice around the coast being such as to prevent the setting of traps at the commencement of the season. Fishing conditions improved, however, later on, with the result that each of the provinces show an increased catch except Nova Scotia, the decrease in the latter province being only 900 cwts.

The total catch was 382,000 cwts., as compared with 364,000 cwts. in 1922. The catch by provinces was:—

Nova Scotia.....	173,000 cwts.
New Brunswick.....	74,000 "
Prince Edward Island.....	97,000 "
Quebec.....	38,000 "

Prince Edward Island shows the largest increase, of about 10,000 cwts.

As the season advanced the market for the canned article became poor, with the result that the live lobster industry received considerable impetus, especially in New Brunswick and Prince Edward Island. On account of the success attained by the shippers of live lobsters during the 1923 season it is thought that a larger proportion of the catch will be shipped alive from these districts in future.

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The catch of oysters was about 4,000 barrels greater in 1923, 21,000 barrels being taken.

Clams and scallops were taken in about the same quantities as in the preceding year.

*River Spawning Fish.*—The catch of salmon was 46,000 cwts., or an increase over the preceding year of 9,000 cwts.

The quantity of smelts taken decreased by 19,000 cwts., only 63,000 cwts. being caught. This was due to the open season during the early part of the winter, when the ice did not form and it was impossible to set nets. New Brunswick was the chief loser in this fishery, the other provinces producing practically the same quantity as in the previous year. On account of the scarcity of these fish the price received by the fishermen was the highest for some time, with the result that the marketed value was somewhat greater than in the preceding year.

The quantity of alewives taken was slightly greater than in the preceding year, the decrease in the Nova Scotia catch being more than made up by the increased catch in the St. John, N.B., district.

## INLAND FISHERIES

There was an increase in the production of the inland fisheries, with the exception of whitefish and tullibee in the province of Manitoba. While the catch of whitefish decreased in lake Winnipeg, there was an increase in Ontario, Saskatchewan, and Alberta, which brings the catch up to the same as the previous year. The decrease in the catch of this species in lake Winnipeg is attributed by some to the fact that the fish did not school and kept scattered, making it hard for the fishermen to locate them.

An increase of about 19,000 cwts. is noted in the catch of pickerel.

There was a decrease in the catch of blue pickerel in Ontario, only 32,000 cwts. being landed compared with 63,000 cwts. in 1922.

An increase in the catch of herring in Ontario is shown, 108,000 cwts. being taken, or an increase of 33,000 cwts.

In the St. John River district of New Brunswick the production of fish was slightly greater.

## PACIFIC FISHERIES

*Salmon.*—There was a slightly increased catch of salmon during the year, 1,515,000 cwts. being taken. The pack is greater by 24,351 cases and amounts to 1,314,677 cases. The pack of sockeye salmon was 334,647 cases, an increase of 35,033; that of cohoes 112,044 cases, an increase of 9,199 cases. A decrease of 141,047 cases is noted in the pack of pinks, while 418,055 cases of chums were canned, or an increase of 159,851 cases.

*Halibut.*—The catch of halibut gives an increase of 41,483 cwts., there being about 335,000 cwts. landed. This constitutes a record for landings of this species in British Columbia ports.

Of the quantity landed in 1923 American vessels brought in 203,666 cwts.

*Herring.*—There was a slight increase in the catch of herring, 1,035,823 cwts. being taken. As usual the bulk of this catch was dry salted for the Orient, where a ready market and good prices were obtained.

*Pilchards.*—The catch of pilchards was about the same as in the previous year. The fish are quite plentiful on the west coast of Vancouver island at certain seasons of the year, but the demand is not sufficient to encourage the capture of them in larger quantities.

*Whales and Seals.*—Three whaling stations were in operation during the year at Kyuquot, Rose Harbour, and Naden Harbour. The total catch was 455 whales, which is an increase of 268 over the previous year.

There were 4,424 seals taken during the year compared with 930 in 1923.

### INSPECTION OF FISH

The inspection of certain kinds of fish and the packages in which they are marketed was carried on during the season of 1923 under authority of the Fish Inspection Act. The Act makes it necessary for packers to have both fish and barrels in accordance with its requirements and empowers inspectors to examine such whenever and wherever it is necessary and convenient. The work was carried on by a staff of three permanent and twelve temporary inspectors on the Atlantic coast, and two temporary inspectors on the Pacific coast.

On the Atlantic coast sixty-six thousand barrels and nine hundred and twenty pails of pickled fish, and almost thirty thousand boxes of smoked herring, passed through the hands of the inspectors who examined them as to the quality and construction of barrels and the weight, quality, grade and curing of the fish in accordance with the requirements of the Act.

On the Pacific coast, the large and growing trade in dry-salted herring between British Columbia and the Orient was supervised by the department's inspectors.

Provided the container is of the standard size and filled to capacity with properly cured fish, a certificate to that effect is given by the inspector to the shipper of each consignment as it is inspected. This system of inspection is proving to be very satisfactory to the trade.

During the past winter herring season in British Columbia, there were inspected two hundred and forty-four thousand boxes, each containing four hundred pounds of herring. Of that total, one hundred and seventy thousand three hundred and seventy-eight boxes were packed on the west coast and seventy-three thousand six hundred and twenty-two boxes on the east coast of Vancouver island. When it is noted that at an average price, f.o.b. British Columbia, of six dollars per box the total value of this trade amounts to almost one and one-half million dollars, its importance as a branch of the fishing industry of the Pacific province is immediately apparent. In addition to that quantity of dry salted herring, there were also packed in the Scotch style thirteen hundred and forty-four barrels, nine hundred and twenty-five half-barrels and fifteen hundred and sixty-four small packages. These were all duly inspected.

The very great improvement in the strength, tightness and good quality of the barrels now being used under this system of inspection, and the very marked improvement in the quality of the fish packed, is resulting in much greater use being made of the inspectors on the part of not only fishermen but dealers and shippers.

### INSPECTION OF CANNERIES AND CANNED FISH

The inspection of fish canneries of all kinds, the raw materials used therein, the whole process of canning, the canned product itself and the labelling and designating of such was carried on during the year as usual under the provisions of the Meat and Canned Foods Act. This inspection is carried on by the department's staff of Fishery Overseers as part of their ordinary duties. The inspection aims at the extension of the trade by improving the quality of the product, and the protection of the public by preventing the packing of

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unsound fish, and seeing that all cans of fish are correctly labelled. Imported canned fish also is subject to inspection under the Act, and must be in accordance with the provisions thereof as to soundness, weight and proper designation.

## FISHERIES INTELLIGENCE SERVICE

Under this service there was carried on during the season of 1923:—

1. The collection of monthly statistics of the sea fisheries, and the compilation of such in a summarized form for publication through the press each month.

2. The publication of a quarterly bulletin containing the statistics in detail. The bulletin is distributed to the trade and all directly concerned. The statistics are practically all collected by the regular fishery officers while performing their other duties as such, and at very little additional cost.

3. The collecting of information concerning supplies of bait day by day along certain stretches of the coast during the spring and summer months. The information is gathered by the officers of the department, who send it by telegram daily to certain ports where it is posted up for the information of Masters of fishing vessels and those looking for bait.

## FISH PUBLICITY CAMPAIGN

From October to March last, the department assisted a committee of the Canadian Fisheries Association to carry on a campaign of advertising for the purpose of increasing the consumption of fish and thereby ultimately improving the condition of the fishing industry generally. The campaign was short and the ground has really only been broken. Evidence is on hand, however, showing that sales of fish increased very markedly as a result of the publicity work, and there need be no doubt that further efforts along the lines will result beneficially to the industry by further increasing the consumption of fish.

## FISHING BOUNTY

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1923, payment was made on the following basis:—

To owners of vessels entitled to receive bounty—\$1 per registered ton: payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty—\$9 each.

To owners of boats measuring not less than 13 feet keel—\$1 per boat.

To boat fisherman entitled to receive bounty—\$7.60 each.

There were 8,915 bounty claims paid. In the preceding year there were 11,204 bounty claims paid.

The total amount paid was \$159,916.80, allocated as follows:—

To 508 vessels and their crews, \$45,664.95.

To 8,407 boats and their crews, \$114,251.85.

## FISHING BOUNTY EXPENDITURE FOR 1923-24

County	Boats	Men	Amount	Vessels	Tons	Av. Tons	Men	Amount	Paid
			\$ cts.					\$ cts.	
<i>Nova Scotia</i>									
Annapolis.....	148	237	1,949 20	1	60	60	19	231 00	149
Antigonish.....	148	214	1,774 40						148
Cape Breton.....	217	368	3,000 30	19	282	15	56	786 00	236
Cumberland.....	2	2	17 20	1	11	11	2	29 00	3
Digby.....	326	529	4,341 90	2	24	12	7	87 00	328
Guysboro.....	520	817	6,695 45	36	545	15	144	1,841 00	556
Halifax.....	1,026	1,294	10,846 90	48	884	18	262	3,242 00	1,074
Inverness.....	283	569	4,582 65	10	143	14	44	539 00	293
Kings.....	33	47	390 20						33
Lunenburg.....	579	738	6,158 55	128	7,175	56	1,733	22,772 00	707
Pictou.....	40	62	499 95						40
Queens.....	113	174	1,428 65	11	137	13	39	488 00	124
Richmond.....	304	510	4,150 75	14	231	16	54	717 00	318
Shelburne.....	402	730	5,945 50	17	336	20	235	2,416 15	419
Victoria.....	267	392	3,210 20	5	89	17	22	287 00	272
Yarmouth.....	85	181	1,460 60	10	510	51	96	1,374 00	95
Total.....	4,493	6,864	56,452 40	302	10,427	34	2,713	34,809 15	4,795
<i>New Brunswick</i>									
Charlotte.....	229	409	3,314 90	4	50	12	12	158 00	233
Gloucester.....	108	248	1,990 55	184	2,631	14	827	10,065 80	292
Kent.....	11	19	155 40	6	64	11	15	199 00	17
Northumberland.....				2	21	10	5	66 00	2
Restigouche.....	2	6	47 60						2
St. John.....	12	15	126 00						12
Total.....	362	697	5,634 45	196	2,766	14	859	10,488 80	558
<i>P. E. I.</i>									
Kings.....	181	251	2,050 35	3	42	14	8	114 00	184
Prince.....	416	789	6,225 65	1	12	12	2	30 00	417
Queens.....	98	209	1,679 65	2	27	13	3	54 00	100
Total.....	695	1,249	9,955 65	6	81	13	13	198 00	701
<i>Quebec</i>									
Bonaventure.....	337	588	4,466 05	3	33	11	9	114 00	340
Gaspe.....	1,976	3,819	30,307 40	1	10	10	5	55 00	1,977
Matane.....	99	135	1,100 25						99
Saguenay.....	445	789	6,335 65						445
Total.....	2,857	5,331	42,209 35	4	43	11	14	169 00	2,861
Grand total.....	8,407	14,141	114,251 85	508	13,317	26	3,599	45,664 95	8,915

## FISH CULTURE

The fish cultural operations of the department during the calendar year, 1923, were mainly devoted to the more important fresh water and anadromous food fishes, such as Atlantic salmon in the East, whitefish, salmon trout and pickerel in the interior and the Pacific salmon in the West.

A general improvement in the roads and the more extensive use of automobiles has brought trout streams that were previously considered rather remote within reach of a vastly increased number of anglers. Consequently a much heavier toll is taken, not only in the streams that are near the centres of population, but from those at a distance which were previously beyond the reach of the majority of the residents.

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To meet this increase in trout fishing, the propagation of the species was taken up on a more extensive scale than in the past and a comparatively large portion of the best angling waters of Nova Scotia was thoroughly prospected by hatchery officers with a view to locating places where trout eggs are obtainable in reasonable numbers. The area, however, is so extensive that but a comparatively small portion of it could be covered this year, and no large and productive spawning grounds were located, but valuable information regarding certain areas was obtained, which will greatly assist in future operations. For the first time speckled trout eggs were collected in Boundary and Violin lakes, near Nelson, in southern British Columbia. The species was introduced into these waters in recent years and have done so well that nearly one million eggs were secured from them this season.

The Atlantic salmon eggs were, as is customary, obtained from fish which were purchased from the commercial catch or were caught in nets operated under contract for the purpose. Practically all the salmon trout eggs and a portion of the whitefish and pickerel eggs were obtained from the commercial catch of the gill-net fishermen, and the balance from fish captured in nets operated by hatchery officers. The eggs of Pacific salmon were obtained in the usual way from fish that were intercepted in the streams on their way to the upper spawning beds.

The collection of speckled trout eggs was the largest since 1917, and was further increased by purchase and exchange. All previous collections of whitefish were exceeded in the bay of Quinte; around Pelee islands, lake Erie; in the lake of the Woods and in lake Winnipegosis. The total collection exceeded that of last year by one hundred million. The pickerel collection was the largest on record, being one hundred and fifty-four million in excess of last year. The collection of sockeye eggs compared favourably with the best of recent years. The collection in the Fraser River watershed was the fifth highest on record and could have been increased had hatchery accommodation been available. It is significant that over eleven million eggs were obtained from fish that were captured in and around the entrance of the ditch that leads from the ponds of the Harrison Lake hatchery, from which a considerable number of fry were liberated four years ago.

The total collection of eggs was two hundred and forty-one and one-half million in excess of that of last year. This collection was augmented by the purchase of trout eggs, thus bringing the total receipt of eggs to over two hundred and forty-three million in excess of 1922. The following summary gives, by species, the total receipt of eggs during the year ended December 31, 1923:—

Atlantic salmon.....	22,383,000
Rainbow trout.....	20,500
Cutthroat trout.....	619,860
Steelhead salmon.....	43,650
Kamloops trout.....	2,240,500
Sockeye salmon.....	102,386,100
Spring salmon.....	1,073,000
Coho salmon.....	2,008,000
Pink salmon.....	4,003,900
Chum salmon.....	2,900
Speckled trout.....	2,060,820
Whitefish.....	698,860,000
(a) Salmon trout.....	39,681,500
Cisco.....	22,182,000
(b) Pickerel.....	388,180,000
	<hr/> 1,285,745,730

15 GEORGE V, A. 1925

*Brought forward* 1,285,745,730

Rainbow trout from the state of New Hampshire in exchange for Atlantic salmon.....	115,000
Rainbow trout from the Southside Sportmen's Club, Long Island, N.Y., donation.....	36,000
Cutthroat trout from the United States Bureau of Fisheries in exchange for Atlantic salmon.....	250,000
Steelhead salmon from the United States Bureau of Fisheries in exchange for Atlantic salmon.....	330,000
Speckled trout from the State of New Hampshire in exchange for Atlantic salmon.....	1,335,500
Speckled trout purchased.....	325,000
Loch Leven trout from the United States Bureau of Fisheries in exchange for Speckled trout.....	411,000
	<hr/> 2,802,500
	1,288,548,230

(a) Out of this number 1,414,000 were shipped to the Quebec Provincial Government.

(b) Out of this number 10,000,000 were shipped to the North Dakota Game and Fish Commission.

In addition to the above the following were received:—

Cutthroat trout fry from the Cranbrook District Rod and Gun Club in exchange for Kamloops trout.....	25,000
Black bass, two and a half to five inches in length, from the North Dakota Game and Fish Commission in exchange for Pickerel.....	975
Crappie, two to five inches in length, from the North Dakota Game and Fish Commission in exchange for Pickerel.....	400

## PLANTING OF EYED EGGS

The planting of eyed sockeye salmon eggs on selected portions of what were at one time the most important spawning areas of the Upper Fraser watershed and other isolated waters was continued on a more extensive scale than ever before. Under existing conditions, this is the only feasible method whereby many extensive and important spawning grounds can be restocked. These grounds are so far removed from existing hatcheries that it is quite out of the question to transfer fry from the hatcheries to them. Plantings of this nature were made from the Pemberton hatchery in the Quesnel lake, the Anderson and Seton lakes and the Stuart lake areas of the Upper Fraser; from the Cultus Lake hatchery to the Shuswap lakes area, all in the Fraser River watershed; from the Anderson Lake hatchery to Great Central and Sproat lakes, Vancouver island, as well as numerous smaller plantings in other places.

## STOCKING OF BARREN LAKES

The stocking of barren lakes from which mature fish are shut off by falls and other barricades was continued on a more extensive scale. The returns that are apparent from such plantings are most gratifying and the various hatchery officers in the more remote and mountainous districts gave considerable time to an examination of their surroundings with a view to a further extension of such work. Lakes of this nature are usually teeming with natural food and, as they contain few, if any, mature fish or enemies, they are, in effect, natural retaining ponds on an extensive scale.

## REARING OF FRY

Retention and feeding of fry was given greater attention, and the distribution of advanced fry and fingerlings was greater than ever before, exceeding the record distribution of 1922 by twenty per cent. The expansion in this direction that has taken place in recent years is indicated, as follows:—

	Number distributed.
1921.....	22,253,000
1922.....	28,672,900
1923.....	35,412,000

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## TRANSFER OF MATURE FISH

Numerous lakes in the Prairie Provinces that do not contain fish and are not suitable for the better species handled in the hatcheries were stocked with yellow perch, catfish, pike and suckers by transfer from other bodies of water. Selected waters in British Columbia also received allotments of small black bass in the same way from waters in the province in which they have been established. White Bear or Carlyle lake, near Carlyle, and Ketepwa lake, near Fort Qu'Appelle, Sask., were also stocked with black bass and crappie fingerlings, which were secured through the North Dakota Game and Fish Commission from the overflowed lands adjacent to the Mississippi river, in exchange for pickerel eggs from the Kenora hatchery.

## DESTRUCTION OF COARSE FISH

Since commercial fishing started in lake Winnipegosis, Manitoba, the suckers and other coarse fish have rarely brought sufficient prices to pay for handling. Consequently, the fishermen have devoted their energies to the taking of whitefish and other marketable species, the result being that the coarse fish increased in numbers out of all proportion to the better varieties. The predominance of the coarse fish also tends to keep down the better varieties and further upset the balance of nature. On the other hand, there are numerous small prairie lakes in which no fish are indigenous and any variety is considered a boon by the local residents. Consequently, suckers were trapped as they were ascending some of the streams in the southern part of lake Winnipegosis to spawn. These fish were destroyed and the eggs of such as were ripe when they were caught were utilized for stocking the poorer class of prairie lakes, above referred to. In addition to the eggs a considerable number of the fish themselves were transferred to the lakes in question.

Forty-two thousand suckers were destroyed in lake Winnipegosis and twenty-eight thousand coarse fish, principally squaw fish, were destroyed in Cultus lake during the season.

## ACCLIMATIZATION

Spring salmon of the Pacific have been caught in lake Ontario in all stages of growth, from the fry a few weeks old to mature fish in spawning condition, over twenty pounds in weight. Eastern whitefish up to four and one-half pounds in weight have been caught in British Columbia lakes. Black bass from the East are firmly established in Christina lake in southern British Columbia and in several lakes in Vancouver island. Eastern speckled trout abound in one or more lakes in British Columbia, the Atlantic salmon of various sizes, from fingerlings to fresh run fish in prime condition, and kelt on their return to sea after spawning have been caught in the Cowichan river, British Columbia, within the last two years. One angler of Duncans has captured no less than seven adult Atlantic salmon in this stream.

## EXPANSION

Owing to a lack of the necessary appropriation, no expansion in the way of new establishments was accomplished, but operations from existing hatcheries were extended in the way of prospecting undeveloped areas with a view to collecting eggs and in improving the facilities and extending operations at existing hatcheries. The old hatchery at Pitt Lake, which was a temporary structure, was replaced by a log building 44 feet by 40 feet, with a capacity of four million five hundred thousand eggs. An eyeing station with the capacity of one million five hundred thousand eggs was provided in rented quarters in Nelson, B.C., and an experienced hatchery officer was loaned to direct the operation of a small hatchery built by the Rod and Gun Club of Cranbrook, B.C.

## INSPECTIONS

Thorough inspections were made by District Inspector Harrison of a large part of the interior of southern British Columbia and of the Quesnel lake district for the purpose of ascertaining their requirements and possibilities from a fish culture standpoint. A large portion of the interior of Nova Scotia was covered by Chief Inspector Finlayson, and the headwaters of the Northeast Margaree river and of Little river, Cheticamp and the lakes of that region were covered by District Inspector Catt. These last two inspections were for the purpose of determining the possibilities of the respective districts from the standpoint of collecting speckled trout eggs. At the present time the department is operating thirty-three main hatcheries, nine subsidiary hatcheries and four salmon retaining ponds. The output from these establishments during 1923 was over twenty per cent in excess of that of 1922, and is shown by species and provinces in the following statement:—

## HATCHERY OUTPUT, BY PROVINCES, OF EGGS, FRY AND OLDER FISH DURING 1923

Nova Scotia—			
Atlantic salmon.....	7,933,650		
Rainbow trout.....	96,500		
Speckled trout.....	522,800		
			8,552,950
New Brunswick—			
Atlantic salmon.....	8,902,395		
Rainbow trout.....	407		
Speckled trout.....	319,409		
			9,222,211
Prince Edward Island—			
Atlantic salmon.....	985,842		
Speckled trout.....	209,292		
			1,195,134
Ontario—			
Atlantic salmon.....	148		
Spring salmon.....	175,480		
Whitefish.....	335,595,000		
Salmon trout.....	29,063,850		
Cisco.....	1,850,000		
Pickrel.....	169,570,000		
			536,254,478
Manitoba—			
Whitefish.....	150,080,000		
Pickrel.....	41,590,000		
			191,670,000
Saskatchewan—			
Whitefish.....	24,470,000		
Black bass.....	898		
Crappie.....	365		
			24,471,263
Alberta—			
Atlantic salmon.....	142,333		
Rainbow trout.....	14,732		
Cutthroat trout.....	408,769		
Steelhead salmon.....	260,919		
Sockeye salmon.....	4,503		
Spring salmon.....	2,346		
Coho salmon.....	21,080		
Chum salmon.....	1,953		
Salmon trout.....	178,064		
			1,034,699
British Columbia—			
Atlantic salmon.....	629,588		
Rainbow trout.....	10,905		
Cutthroat trout.....	135,836		
Steelhead salmon.....	41,791		
Kamloops trout.....	2,075,509		
Sockeye salmon.....	89,261,250		
Spring salmon.....	2,094,046		
Coho salmon.....	1,675,700		
Pink salmon.....	3,713,900		
Chum salmon.....	2,892,370		
Speckled trout.....	56,720		
Whitefish.....	12,002,000		
			114,589,615
			886,990,350

## WORK OF BIOLOGICAL STATIONS IN CANADA

## ATLANTIC STATION, ST. ANDREWS, N.B.

The subjects investigated by the various workers were as follows:—

Miss Helen Battle, Western University: The effect of extreme physical conditions on the course of the development in fishes.

Miss F. M. Burwash, University of Toronto: Occurrence of iodine in the haddock.

Miss J. T. Henderson, McGill University: The life history of the gribble, *Limnoria*.

Dr. A. G. Huntsman, Director: Supervision.

Dr. F. S. Jackson, McGill University: The comparative histology of the pancreas in fishes.

Prof. A. B. Klugh, Queen's University: The culture of fresh-water entomostrea, and the measurement of light in aquatic habitats.

Prof. A. P. Knight, Chairman of the Board: General supervision; problems in lobster canning.

Mr. A. H. Leim, University of Toronto: The life-history of the shad.

Miss M. Lenz, Queen's University: The effect of various bacteria in decomposing the meat of the lobster.

Mr. N. A. McCormick, University of Toronto: The insulin content of the pancreas and related glands in fishes and other marine animals.

Mr. R. H. McGonigle, University of Toronto: The distribution of the shipworm and the gribble.

Mr. D. J. McLeod, Queen's University: The effect of various bacteria in decomposing the meat of the lobster.

Mr. E. C. Noble, University of Toronto: The insulin content of the pancreas and related glands in fishes and other marine animals.

Prof. E. E. Prince, Secretary-Treasurer of the Board: Administration.

Prof. G. B. Reed, Queen's University: The early stages of bacterial decomposition of the lobster meat.

Mr. W. C. M. Scott, University of Toronto: The embryology of the liver, the pancreas and the islets of Langerhans in bony fishes.

Mr. R. G. Sinclair, Queen's University: A study of fresh-water entomostrea.

Miss E. A. Smith, Queen's University: The rate of migration of the bacteria of decomposition from the intestinal tract of fish.

Mr. M. I. Sparks, University of Toronto: The effect on marine animals of extreme temperatures.

Miss E. M. Taylor, University of Toronto: The physical factors determining the hatching of fish eggs.

Miss H. I. Wilton, Queen's University: The growth of the clam under various conditions.

Miss M. H. Wilton, Queen's University: The growth of the clam under various conditions.

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The Royal Ontario Museum of Zoology sent to St. Andrews three members of its staff, Dr. E. M. Walker, Mr. A. Kurata and Mr. S. Logier, who were given the facilities of the laboratory for the collection of material, in particular of fishes, of which a large number of casts were made. Dr. D. Fairchild and Mr. G. B. Fairchild, of Washington, D.C., were granted the facilities of the laboratory for a part of the month of August.

The weekly and monthly collections of plankton and hydrographic material at established points in the Passamaquoddy region, and daily records of the temperature of water and air at St. Andrews have been continued.

## FIELD INVESTIGATIONS

An expedition was organized under Dr. Huntsman for investigating the strait of Belle Isle and neighbouring waters in relation to the cod and other fisheries, support for this being given by the Fisheries Branch. The *Prince* operated in the region of the strait from the latter part of July to the middle of September. The C.G.S. *Arleux*, with Dr. Huntsman, Dr. L. Gilchrist of the University of Toronto, and Mr. A. C. Gardiner of Cambridge University (representing Newfoundland), made a general survey during August and September of the region from Cabot strait and Anticosti island through the strait of Belle Isle and around the eastern and southern coasts of Newfoundland. The results obtained demonstrated the dependence of the cod fishery on the hydrographic conditions.

Professor Knight in the early part of the season continued his investigation of the condition of lobster canneries.

Mr. H. C. White, of Queen's University, followed up the results of the planting of trout fry in two brooks near Aylmer, Ont., determining their habits, their enemies, and the number of survivors.

Under a grant from the Council for Scientific and Industrial Research, Mr. R. H. McGonigle, of the University of Toronto, made a survey of the Atlantic coast from the bay of Fundy to the estuary of the St. Lawrence in order to determine the extent of the activities of the marine borers that destroy the wood of piles, buoys, etc.

The Station undertook to co-operate with the Department of Public Works in the examination of test blocks put out in selected harbours along the coast to show the character and rate of attack by marine boring animals. Miss Jean Henderson took over the examination of these blocks.

The study of the currents by means of drift bottles, in which the countries represented on the International Committee on Deep Sea Fisheries Investigations co-operate, has been continued. Two thousand three hundred and twenty drift bottles were put out during 1923 in the following series: From cape Pine south, through the courtesy of the Newfoundland Government; across the St. Pierre bank, by Dr. Ed. LeDanois with the French cruiser *Ville D'Ys*; across the Labrador current north of Belle Isle by the C.G.S. *Arleux*; at a number of points across the strait of Belle Isle by the *Prince*; across Cabot strait by the *Prince*; and three series along the coast of Nova Scotia by the *Prince*.

## PACIFIC STATION, NANAIMO, B.C.

Prof. O'Donoghue acted as director for the season of 1923.

The subjects investigated by the various workers were as follows:—

Mr. C. Berkeley: Biochemical studies on molluscs and fishes.

Mr. Jas. Dauphinee, University of British Columbia: Arginase in the tissues of fishes.

Miss E. S. Dowding, University of Alberta: Fluorescence in marine algæ.

Mr. H. A. Dunlop, University of British Columbia: The growth of salmon; pelagic copepods.

Prof. A. Hunter, University of Toronto: Arginase in the tissues of fishes.

Prof. F. J. Lewis, University of Alberta: The conifers.

Prof. C. H. O'Donoghue, University of Manitoba: Migration of starfish; systematic study of Holothurians, Nudibrachs, Testibrachs and Bryozoa.

Mr. H. C. Wailes, Vancouver, B.C.: Marine and fresh water Protozoa.

Mr. A. Fee, of the University of British Columbia, was given the facilities of the laboratory for the summer in return for assistance with the collections.

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Trips of exploration were made to Union bay, Discovery passage, Friday harbour, and Victoria.

Mr. R. E. Foerster investigated the life-history of the sock-eye salmon in Harrison and Cultus lakes, with particular reference to the food and enemies of the young.

The Station co-operated with the Department of Public Works in studying the work of the marine boring animals that attack wood. Mr. Dunlop undertook the examination of the test blocks sent in from time to time from the series placed at suitable points on the coast by the engineers of the department.

The retiring director, Dr. C. McLean Fraser, represented the Station at the Pan-Pacific Scientific Congress held in Australia in August, 1923.

In the course of the past year the membership of the Biological Board was increased by the addition of three members, two, Mr. A. Hanfield Whitman of Halifax, N.S., and Mr. John Dybhavn from Prince Rupert, from the fishing industry, and one, Mr. J. J. Cowie, from the administrative staff of the department.

## EDUCATIONAL EFFORT

A sum of seventy thousand dollars has been placed at the disposal of the Biological Board for the purpose of establishing stations on the Atlantic and Pacific coasts at which will be given to fishermen and others directly concerned practical demonstrations in the best methods of processing all kinds of fish, and from which will emanate to the villages and settlements all over the coast the knowledge acquired at the stations. The centre of the educational effort on the Atlantic coast will be at Halifax. It is intended that the Halifax station will contain a chemical laboratory, a bacteriological laboratory, a model fish canning plant, a model fish drying plant, a model smoke house and means for demonstrating the most approved methods of curing various kinds of fish. It is planned further to build up a museum furnished with models and photographs of boats and vessels of different types used in the fisheries in the principal fish producing countries of the world, also of nets, lines, traps and other fishing gear, of curing establishments, etc., and the utensils used therein, and where lectures will be given on all phases of the fishing industry. In short, it is intended to make the station a centre from which definite practical information can be obtained upon all subjects connected with the business of fishing and the preparation of fishery products.

In connection with the stations, the Biological Board plans to arrange for public addresses to be given in different places along the coast by men who are recognized leaders in the fish business. Definite efforts will also be made to publish educational pamphlets on different fishery subjects. Ultimately, as the utility of the station becomes recognized and a demand arises in outlying points for technical instruction, short courses of instruction will be provided in different localities.

It is anticipated that the board will establish its educational centre on the Pacific at Prince Rupert.

## NATURAL HISTORY OBSERVATIONS

In the course of the summer and fall of 1923, the department's naturalist continued his observations along the shores of Cumberland, Pictou, Antigonish, Richmond and Cape Breton counties, Nova Scotia, with a view to gathering knowledge of the sex, size, weight and spawning condition of lobsters in these waters. He also continued his investigations into the condition of the scallops in Mahone Bay, N.S. In addition to these, the naturalist carried on investi-

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gations into the run of salmon to the Nova Scotia rivers emptying into the strait of Northumberland and of the seasonal changes this fish undergoes in passing from the sea to its spawning beds. As a result of these observations much interesting and useful information has been placed in the hands of the department.

The prosecution of our fisheries is a hazardous business and year by year the toll paid in human life is considerable. I regret to report, therefore, that during the year under review thirty-one fishermen were lost; twenty-three on the Atlantic and eight on the Pacific.

I am, sir,

Your obedient servant,

A. JOHNSTON,  
*Deputy Minister of Marine and Fisheries.*

## APPENDIX I.

## REPORTS OF INSPECTORS OF FISHERIES

REPORT OF CHIEF INSPECTOR WARD FISHER, PROVINCE OF  
NOVA SCOTIA, FOR 1923

Each year reveals one or more outstanding condition affecting the fishing industry. Obviously this is to be expected, as the fisheries are of a most varied nature and the ramifications of the trade extensive. Nineteen twenty-three presented unusual conditions and problems, as can readily be appreciated by the very considerable decrease in the catches of several principal varieties of fish, and in the substantial decrease in the total landed and marketed values.

Extraordinarily severe weather and ice conditions prevailed during the first four months. The coast was hemmed in by extensive ice-fields, preventing the launching of small boats, thus causing continued suspension of the operations of the inshore fishermen, except comparatively small and desultory efforts in several of the more favourably located districts. If it had not been for the steam trawler fleet the valuable fresh and smoked fish trade that has been developed the past ten years would have been badly demoralized, as the demands of the markets would have had to be met by shipments from the United States. The trawler fleet was the only dependable source of supply, and while experiencing exceptional operating difficulties continued to land fair catches during the four months.

The above noted unfavourable conditions were greatly aggravated by the American tariff, resulting in general discontent on the part of the fishermen, as the buyers were unable to sustain or increase the prices for the catches. The high cost of operations, together with the low prices for the catches, resulted in a large number of fishermen abandoning the industry for other means of employment, or leaving the province for the time being.

While the above brief review may not be particularly heartening, due to abnormal conditions obtaining which were beyond the control of the Canadian authorities, there has been the saving element of a settled determination to hold fast to the industry for the better times that are bound to come as normal conditions return.

It is gratifying to report that the fresh fish trade, and also the trade in smoked fish, particularly finnan haddies and fillets, withstood the shock of the American tariff, and, indeed, was increased as the efforts of the dealers to extend the Canadian trade met with signal success.

In addition to the general expansion of the Canadian trade, successful experiments were made to gain markets at points hitherto looked upon as too remote to be considered. For instance, smoked shipments were made to Denver, Colorado. The shipments arrived in excellent condition and resulted in a repeat order by wire. A shipments of 4,000 boxes of specially processed smoked fish to Cape Town, South Africa, also arrived in good condition, with the probability that a permanent trade may be developed with that distant country.

The lobster fishery of the western district opened March 1, under heavy disabilities, as the ice was piled in heaps along the shore, making impossible any operations of a remunerative character. The total catch for March and April was only 12,511 cwts., valued at \$278,437, as compared with 26,266

cwts., and \$496,631, the same two months of the previous year. It will be of interest to note that the catch for March and April, 1921, when the fishery was operated under most favourable conditions, was 66,326 cwts.

Happily the abnormal features that obtained during the first four months were greatly relieved, and conditions generally improved until the end of the year. The prospects for 1924 are good, as the available supplies will in all likelihood be absorbed early in the new year.

#### THE MARKETS

The markets were most unpromising for the greater part of the year. The more distant foreign trade had not recovered from the general depression of the previous years, consequently the adverse exchange made impossible any worth-while resumption of business. In addition, the American tariff gave substantial grounds for believing that the trade in pickled fish would be unremunerative. The duty of \$2 per barrel was considered prohibitive. As a consequence many of the fishermen abandoned the herring fishery. Pickled herring was a drug on the market, selling as low as \$4 per barrel. Also the increased duties on fresh and other fish greatly disturbed the trade and seriously affected the prices paid the fishermen for their catches. It is estimated that over 30 per cent of the fishermen suspended operations; in some districts fully 80 per cent ceased operations for some months.

The alarm, however, was greater than the situation warranted, as the markets improved to a marked degree toward the end of the year, when good quality pickled herring and mackerel were at a premium, while the supply of dried fish had been well absorbed at satisfactory prices, with the prospect that the available stock would be all taken up before the spring catch of 1924 would be ready for the market. It is fairly safe to state that a first class grade of pickled herring will find ready sale at \$10 per barrel, and dried fish at \$9 or \$9.50 per quintal.

The canned lobster trade suffered unusual depression, which involved a number of the dealers in heavy losses. Some 60,000 cases of the total Canadian pack, carried over from 1922, were unsold, and as a consequence of the heavy operations of 1923 it was quite impossible for the markets to absorb the heavy carry-over. At the end of the year about 50,000 cases were in store, with little prospects of being disposed of except at prices below the cost of production. The packers will be under the necessity of reducing the prices to the fishermen the coming year or of reducing the pack by at least one-third. The latter course is improbable, if not indeed quite impracticable, unless action is taken to prohibit the taking of small lobsters in districts favourably located for the trade in live lobsters of export size.

#### CATCHES AND VALUES

The following is a summary of the catches and values of some of the principal varieties of fish. As a significantly noteworthy arrangement, the lobster fishing and canning industry has the place of honor which it has gained by its actual value to the fishermen and its importance to the export trade as compared with the cod and other fisheries that have hitherto had precedence in the estimation of values. The total landed value of the cod fishery of Nova Scotia for 1923 was \$1,796,770, while the total value of the lobster catch was \$2,239,187. In the table of fish and fish products exported from the whole of Canada for 1922, as compiled by the External Trade Branch of the Dominion Bureau of Statistics, the value of the lobsters exported is shown to be \$6,097,710, while that of cod was \$5,719,627, or \$378,083 in favour of the lobster industry.

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It is quite apparent from the above that the strong and continued agitation for increased protection to the lobster fishery is based on sound economic grounds and should receive the consideration the importance of the industry deserves. It is hoped that definite steps may be taken at an early date for a thorough-going investigation of the conditions at present affecting the fishery.

## THE LOBSTER FISHERY

The total lobster catch for 1923 was 172,720 cwts., having a landed value of \$2,239,187, as compared with 173,706 cwts., and \$1,953,848 for 1922.

The total pack for 1923 was 63,971 cases, as compared with 64,552 cases for 1922. The total value of the pack was \$2,040,505 for 1923 as compared with \$2,018,315 for 1922.

The total marketed value for 1923 was \$3,081,647 as compared with \$2,913,087 for 1922.

The following is the catch and pack by counties:—

	Catch		Pack	
	cwts.	\$	cases	\$
Inverness.....	17,366	185,307	8,120	249,943
Victoria.....	8,300	73,731	3,737	139,842
Cape Breton.....	14,602	126,435	7,201	225,032
Richmond.....	6,464	64,346	2,640	77,011
	46,732	449,819	21,698	691,828

Of the above 355 cases of tomalley, valued at \$3,599 are included.

Halifax.....	5,892	84,244	1,346	44,029
Guysboro.....	9,717	103,068	3,414	104,715
Antigonish.....	10,956	117,844	5,473	171,690
Pictou.....	21,575	217,369	11,585	341,073
Colchester.....	918	11,018	459	13,750
Cumberland.....	11,290	120,996	5,507	165,664
	60,348	654,539	27,784	840,921

Included in the above pack are 609 cases of tomalley, valued at \$6,322.

Lunenburg.....	1,552	20,084	267	8,041
Queens.....	2,000	25,369	466	13,995
Shelburne.....	16,242	298,891	3,864	130,823
Yarmouth.....	32,340	520,539	8,382	274,827
Digby.....	12,003	231,571	2,603	91,079
Annapolis.....	1,358	34,750		
Kings.....	145	3,625		
	65,640	1,134,829	15,582	518,765

Included in the above pack are 129 cases of tomalley, valued at \$1,088.

## COD AND HADDOCK

The total catch of cod was 1,048,943 cwts., having a landed value of \$1,796,770 and a marketed value of \$2,434,492, as compared with the catch of 1,560,271 cwts., in 1922, having a landed value of \$3,003,056 and a marketed value of \$3,555,637.

The operations of the Lunenburg Grand Banks fleet show that the decrease was largely due to curtailed operations. Eighty vessels only engaged in the fishery during 1923. This is the smallest number for more than twenty years and nineteen less than 1922. The total landings of the fleet were only 194,600 quintals, as compared with 312,075 quintals for 1922. Of this catch 20,550 quintals were taken on the early spring trip, 47,325 in the late spring trip and 126,725 in the summer trip. The average catch per vessel was very good, being 2,432 quintals. The operating expenses of this fishery continue to be heavy since the war, and are out of proportion compared with the prices received for the catches. A fair profit cannot be made at a less price than \$7 per quintal.

The haddock catch was 297,023 cwts., valued at \$486,492, as compared with 298,593 cwts., and \$530,316 in 1922. The marketed value was \$1,029,787.

#### HERRING

The herring catch was 165,886 cwts., having a marketed value of \$295,391, as compared with 183,138 cwts., and \$364,815 in 1922. For several years past the herring fishery has been neglected, owing to the lack of markets for the pickled product. This trade is gradually decreasing.

#### MACKEREL

The total catch was only 79,184 cwts., having a landed value of \$245,666 as compared with 166,538 cwts., and \$825,852 the preceding year. The marketed value was only \$388,051 as compared with \$1,129,104 in 1922.

It will be noted that the decrease in the total value of the fisheries of nearly two million dollars is almost altogether made up of the decreases in the values of the cod and mackerel fisheries, cod being responsible for \$1,121,145 and mackerel \$741,053.

The spring run was small in size and erratic in movement, although good catches were taken in Yarmouth county in June. The Inverness run was a failure. The prices were low, the fishermen receiving only one cent per pound for a large portion of their catches. The catches along the New England coast were unusually large, with the result that the American markets were over supplied, consequently it was impossible for shipments to be made from Nova Scotia, as the prices at Boston were less than the cost of barreling, icing, transportation and duty from Halifax or Yarmouth. The situation was made the more difficult as some of the dealers had considerable stocks in storage of the catch of 1922, for which twenty cents apiece had been paid. It would have been to the advantage of our fishermen and dealers to have pickled the large sized fish, as toward the end of the year there was a good demand for this class of goods, at excellent prices.

#### SALMON

The salmon catch was 11,217 cwts., having a marketed value of \$202,090, as compared with 8,577 cwts., and \$154,771 in 1922.

The following reports by districts will be of interest in showing the local conditions with respect to catches and values:—

DISTRICT No. 1, CAPE BRETON.—Inspector McLeod.

The mackerel and cod were the two deep sea fisheries that suffered from unfavourable conditions; the mackerel run being a failure and the cod prices being so low that many of the fishermen found it unprofitable to operate. Compared with 1922 there were 986 less fishermen, 365 less boats, 1,483 less nets, 3,256 less trawls, and 1,030 less hand-lines engaged in the industry.

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It is encouraging to note the substantial increase, amounting to about \$112,000 in the values of the salmon, swordfish, halibut and squid fisheries.

*Lobsters.*—The catch of lobsters was 46,732 cwts., valued at \$449,819, as compared with 47,898 cwts., valued at \$363,078, for 1922, showing a decrease in the catch of 1,166 cwts. and an increase of \$86,741 in the value. The marketed value was \$730,981, as compared with \$695,851 for last year, or an increase of \$35,130.

The fishery was prosecuted with the greatest vigour, as it afforded remunerative employment and ready returns at the season of the year when other varieties of fish were in poor demand. High prices prevailed throughout the entire season. The financial returns were over 100 per cent higher than cod, which came next in value. The heaviest landings were at Mainadieu, Port Hood Island, Alder Point and Big Bras d'Or.

*Cod.*—The catch of cod was 89,071 cwts., having a value of \$120,196, as compared with 135,635 cwts. and \$178,312 for 1922, showing a decrease in the catch of 46,564 cwts. as well as a decrease in the value of \$58,116 as compared with 1922. Marketed value, \$246,790, and for 1922, \$282,172.

The decrease in the catch is due entirely to fewer fishermen having engaged in the industry. The fish were very abundant on all the fishing grounds, especially during the months of July, August, September, October, November and December. The principal landings were a Petit de Grat, Eastern Harbour and North Sydney.

*Haddock.*—The total landed catch was 58,059 cwts., having a value of \$55,350, as compared with 72,111 cwts. and \$85,773 for 1922, showing a decrease of 14,052 cwts. in the catch and \$30,423 in the value. The marketed value was \$194,117, compared with \$148,691 for 1922, an increase of \$45,426.

The principal landings were at Port Hawkesbury, North and South Ingonish. At North Ingonish a decrease of 11,578 cwts. is shown, due to the suspension of the operations of five trap-nets. At the place during the month of May a great quantity of haddock was liberated from the traps, as the owners would not sell at the low prices offered.

*Herring.*—The catch of herring was 30,007 cwts., having a value of \$27,147, as compared with 26,132 cwts. valued at \$26,028, for 1922, an increase in the catch of 3,875 cwts., and an increase in the value of \$1,119. The marketed value was \$48,733, as compared with \$45,244 for the preceding year, an increase of \$3,489.

The largest landings were at St. Ann's, Eastern Harbour, Grand Etang and Margaree Harbour. The catches were composed of spring herring almost entirely.

*Mackerel.*—The catch landed was 18,717 cwts., valued at \$48,809, as compared with 38,372 cwts., valued at \$154,551, for the preceding year, a decrease of 19,665 cwts. in the catch and \$105,742 in the value. The marketed value was \$76,989, as compared with \$198,158 for 1922, a decrease of \$121,169.

The principal landings were at L'Ardoise, Hawkesbury and Petit de Grat. For some unaccountable reason these fish did not appear on the coast of Inverness in as large schools as in previous years. At Eastern Harbour the catch was only 300 cwts., compared with 4,812 cwts. for the previous year. At Margaree Harbour the catch was only 125 cwts., compared with 1,827 for 1922.

*Swordfish.*—The total catch was 9,364 cwts., valued at \$59,602, compared with 3,409 cwts. with a value of \$42,569 for the preceding year, an increase of 3,409 cwts. in the catch and \$17,033 in the value. The marketed value was \$98,639 compared with \$46,773 for 1922, an increase of \$51,866.

The greatest landings were at Petit de Grat, Louisburg, South Ingonish and North Sydney. These fish were plentiful in the waters surrounding Isle Madame, and also along the coast of L'Ardoise, Gabarus, Louisburg, Mira Bay, Glace Bay and Sydney, but the high wind that prevailed during the time that these fish struck the coast of Ingonish and Neil's Harbour greatly interfered with fishing operations.

*Smelts.*—The catch of smelts was 2,181 cwts., having a value of \$21,764, as compared with 2,209 cwts., valued at \$22,689, for the preceding year, a decrease of 28 cwts. in the catch and \$925 in the value. The marketed value was \$25,623, as compared with \$23,766 for 1922, an increase of \$1,857.

The decrease in the catch is due to the severe weather that prevailed during January and February, and the extremely mild weather during November and December.

*Squid.*—The catch was 1,983 bbls. having a value of \$7,108, as compared with 872 barrels, valued at \$1,910 for 1922, an increase of 1,111 barrels and \$5,198. The total marketed value was \$7,136, as compared with \$1,924 for the year previous, an increase of \$5,212.

These fish were exceptionally plentiful along the coast of Inverness from Hawkesbury to Eastern Harbour, and the catches so heavy that the fishermen were obliged to cease operating, the cold storage plants at Hawkesbury being quickly filled to capacity. Great numbers of these fish ran ashore at the headwaters at Sydney Harbour and St. Ann's Harbour.

*Salmon (Commercial).*—The total landed catch was 3,935 cwts., having a value of \$49,265, as compared with 2,153 cwts., valued at \$24,017, for the preceding year, an increase of 1,782 cwts. in catch and \$25,248 in the value. The marketed value was \$63,386, as compared with \$30,587 for 1922, an increase of \$32,799.

The largest landings were at Margaree Harbour, Grand Etang, Eastern Harbour and St. Ann's. It should also be noted that these fish were of a much larger size than have frequented this coast for the past three or four years.

*Salmon (Domestic).*—Anglers have had the best season known on the Margaree river, and records were established in quantity and size. One sportsman landed eight salmon on August 20, the largest weighing 36½ pounds. Eleven anglers landed 1,361 salmon during the season. The catch with the fly was 137 cwts., compared with 91 cwts. for the preceding year. It is also very pleasing to note that fifteen salmon were caught in the Middle river, and twelve salmon in North river, St. Ann's, with rod and line, where it was supposed that salmon would not take the fly, as none had been caught previous to this season.

As this island is becoming better known as a Fisherman's Paradise, increased demands are made upon overseers and guardians for closer supervision of our excellent sporting streams. It gives me great pleasure to report that the officers of this district have performed their numerous duties in a most efficient manner and are to be highly commended.

*Oysters.*—The catch was 2,136 barrels, valued at \$10,302, as compared with 747 barrels, valued at \$4,278 for 1922, an increase of 1,389 barrels in the catch and \$6,024 in the value. Total marketed value was \$12,147, compared with \$4,478 for 1922, an increase of \$7,669.

The increase in the catch is due to oysters being far more plentiful, favourable weather and an increased number of fishermen engaging in the industry. The largest landings were at Orangedale and Washabuck.

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*Scallops.*—Some were caught on cod trawls in deep water in Inhabitants basin, Richmond county, and some were washed ashore at Money Point, cape Smoky, Aspy bay and cape Dauphin, Victoria county, during the severe storm that raged on October first and second.

DISTRICT No. 2.—Comprising the counties of Halifax, Guysboro, Antigonish, Pictou, Colchester, Cumberland and Hants.—Inspector Sutherland.

There are two distinct classes of fishermen in this district, the one being entirely dependent on the fisheries for a means of livelihood, and the other being composed of farmers who engage in the lobster fishery only. Halifax and Guysboro counties are the chief bone fide fishing districts.

The distinctly fishing districts suffered severely from the depression that has existed since 1920. The farmer-fishermen, however, had a satisfactory season, as the landed value of the lobster catch was the greatest for many years, being \$160,000 in excess of that for the previous year. The fishermen's prosperity, however, was not generally shared by the packers, as the markets for the canned product were greatly overstocked.

The outstanding features of the year's operations were the failure of the mackerel fishery, especially in Halifax county west, and the general increase in the value of the lobster catch.

## CATCHES AND VALUES

*Lobsters.*—The catch was 60,348 cwts., valued at \$654,539, as compared with 63,709 cwts. and \$494,061 in 1922. The noteworthy feature of the fisheries of this district for 1923 was the increase of \$160,478 in the landed value of the lobster catch, while the quantity taken was 3,361 cwts. less than in 1922 notwithstanding the extensions to the regular spring seasons, which accounted for 5,189 cwts. It is interesting to note that the value of the catch to the fishermen in 1923 was \$411,482 greater than the 1921 catch.

Increased catches were taken in Colchester county north (858 cwts.), where two new canneries were operated; Antigonish county (647 cwts.); Guysboro county east (2,039 cwts.); and Halifax county west (1,024 cwts.).

*Cod.*—The catch of cod was 178,932 cwts., valued at \$308,019, as compared with 180,403 cwts. and \$326,869 in 1922. Of the total catch 97,400 cwts. were taken offshore by vessels and steam trawlers, principally the latter; 60,000 cwts. were landed at Canso and 32,600 cwts. at Halifax, and 10,360 cwts. by vessels landing in Halifax county east.

Practically the total catch was landed in Halifax and Guysboro counties, and there was a general decrease in the catch of inshore boats.

*Haddock.*—The catch was 159,359 cwts., valued at \$286,390, as compared with 121,950 cwts. and \$234,668 in 1922; 108,750 cwts. of the catch was taken offshore, principally by steam trawlers landing at Halifax and Canso.

*Herring.*—The catch was 70,527 cwts., valued at \$53,519, as compared with 68,494 cwts., valued at \$67,296, for the previous year. The catch in Cumberland county west, and Antigonish county shows a substantial increase, while smaller catches were landed in Guysboro county and Halifax county east. Owing to especially poor markets the fishermen did not prosecute the fishing with energy. At the end of the year, however, the price of pickled herring was about \$8 per barrel, as the supplies on the market were low. If there had been prospects for such prices, double the quantity of herring would have been packed, especially in Halifax county west.

The total catch for this district was disposed of as follows: Pickled, 6,141 barrels; fresh, 12,825 cwts.; smoked, 12,256 cwts.; and for bait, 7,778 barrels.

*Mackerel*.—The mackerel catch was 34,628 cwts., having a value of \$89,093, as compared with 75,095 cwts., valued at \$342,624, in 1922. The greatest loss of the year was in the mackerel fishery of Halifax county west, where the catch fell off 32,261 cwts., with a loss to the fishermen of \$178,159. The catch in Halifax county east showed an increase. The heavy run of fish came late in May when the prices offered were only about .02½ cents per fish, which did not pay the fishermen to operate. In Guysboro county, mackerel also fell off so that the season throughout this district was a decided failure, although the quantity taken compares favourably with an average season. The home market can absorb only a small part of the catch, and high transportation and tariff make the American market almost prohibitive. Consequently the mackerel fishermen look for little relief until these matters are remedied. The average price offered was .02½ cents per pound.

Unlike 1922, spring mackerel did not trim the shores of Halifax county west and were therefore beyond the reach of seine and trap-net fishermen. Fall mackerel were only taken in Guysboro county east and Halifax county west. Prices during the fall season were somewhat better, about .05 to .06 cents per pound. The salted mackerel market was brisk during the last month of the year.

*Albacore*.—The catch was 2,098 cwts., having a value of \$4,469, as compared with 1,029 cwts. in 1922, valued at \$1,938. The increase in this fishery is due to the fact that albacore were scarce on the American coast during the early part of the season and prices on the Boston market were good. When the price is small the proceeds of sale do not cover duty and transportation charges.

*Shad*.—The catch was 878 cwts., valued at \$9,520, as compared with 485 cwts. in 1922, having a value of \$6,487. The catch of shad was the best since 1917. The two weeks extension to the regular season accounts for 244 cwts. Large numbers of small shad are reported by the fishermen, which would indicate that the three years' close season was of some benefit to the fishery. Practically the total catch was taken in Cobequid bay and Cumberland basin. About 100 barrels were salted and sold for \$30 per barrel, the remainder being sold fresh at \$10 per cwt.

*Salmon*.—The catch was 5,109 cwts., valued at \$65,865, as compared with 4,587 cwts. and \$58,605 in 1922. A further increase is noted in the salmon catch of 522 cwts., but the two weeks extension to the regular season in Pictou and Antigonish counties and bay of Fundy accounts for 206 cwts. Since 1920 the catch has increased about 200 per cent in this district, and is as follows:—1920, 1,717 cwts.; 1921, 3,192 cwts.; 1922, 4,587 cwts.; 1923, 5,019 cwts. The catch for 1923 is the highest since 1913.

*Oysters*.—The catch was 629 barrels valued at \$4,451, as compared with 717 barrels with a value of \$5,214 for the preceding year. The oyster catch shows a further decrease of 88 barrels. This fishery has gradually decreased from 2,000 barrels in 1912 to its present condition.

DISTRICT No. 3.—Comprising the counties of Lunenburg, Queens, Shelburne, Yarmouth, Digby, Annapolis and Kings.—Inspector Marshall.

The conditions in this district were similar to those obtaining generally along the whole coast. There was a decrease in all kinds of vessels and in the

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number of men operating. There were twenty-five less vessels of 40 tons and over, and about one thousand less fishermen engaged in carrying on the work as compared with 1922.

The lobster catch exceeded that of the previous year both in quantity taken and in value. There was also an increase in the quantity and value of the scallop catch.

*Lobsters.*—The catch of lobsters was 65,640 cwts., with a value of \$1,134,829, as compared with 62,099 cwts., with a value of \$1,096,709, for the season 1922, an increase of 3,541 cwts., with a value of \$38,120.

The lobster catch shows a slight increase both in catch and value over the previous year, which increase is accounted for by the extension given covering the month of June, 1923.

The quantity shipped alive from the western district during the past season was 29,777 cwts., valued at \$734,116. Of this quantity 17,772 cwts., valued at \$421,689, were shipped to the American markets via Yarmouth, and 12,005 cwts., valued at \$312,427, shipped by well smacks.

*Cod.*—The total catch was 780,940 cwts., having a value of \$1,368,555, as compared with 1,244,233 cwts., with a value of \$2,497,875, for the previous year, showing a decrease in the catch of 463,293 cwts., valued at \$1,129,320.

*Haddock.*—The catch was 79,605 cwts., having a value of \$144,752, as compared with 104,532 cwts., with a value of \$209,875, for the previous year, a decrease of 24,927 cwts., with a value of \$65,123.

*Herring.*—The catch was 65,352 cwts., having a value of \$70,513, as compared with 88,512 cwts., having a value of \$94,357 for 1922, a decrease of 23,160 cwts., valued at \$23,844.

*Mackerel.*—The catch shows a decrease in the quantity and a marked decrease in the value. The catch landed was 25,839 cwts., valued at \$107,764, as compared with 53,071 cwts., valued at \$328,677, for 1922, a decrease of 27,232 cwts., and a decrease in value of \$220,913.

*Halibut.*—The catch was 8,772 cwts., valued at \$128,806, as compared with the catch for 1922 of 17,214 cwts., valued at \$214,361, a decrease of 8,442 cwts., valued at \$85,555.

*Pollock.*—The catch of pollock was 24,688 cwts., valued at \$22,538, as compared with the catch for 1922 of 47,416 cwts., valued at \$44,282, a decrease of 22,728 cwts., valued at \$21,744.

*Hake and Cusk.*—The catch shows a marked decrease, being only 49,651 cwts., valued at \$45,842, as compared with 142,767 cwts., valued at \$114,364, for 1922, a decrease of 93,116 cwts., valued at \$68,522.

*Salmon.*—The catch was 2,173 cwts., valued at \$49,925, as compared with 1,837 cwts., with a value of \$46,310, for 1922, an increase of 336 cwts., with an increase in value of \$3,615. There has been a marked increase in this fishery for the past three years, this being about a \$16,000 increase in value over the year 1921.

I find the total quantity of salmon taken in tidal waters with nets and weirs is 1,977 cwts., with a value of \$46,559, and 196 cwts., valued at \$3,366, taken in our rivers with rod and fly.

*Scallops.*—The catch shows 11,839 barrels taken, with a value of \$68,337, as compared with 10,682 barrels, with a value of \$49,678 for 1922, an increase of 1,157 barrels, with a value of \$18,659. Of this catch 7,577 barrels having a value of \$43,714 were taken in the Bay of Fundy and 4,262 barrels, having a value of \$24,623 in the county of Lunenburg. The above shows a steady

increase in the scallop fishery in the bay of Fundy, and there is no doubt but that it will continue to increase each year, as more fishermen fit out to carry on scallop fishing operations.

#### LICENSES ISSUED—NOVA SCOTIA

Lobster pound.....	4	Salmon gill-net.....	438
“ packing.....	166	“ trap-net.....	335
“ “ -exten.....	111	Smelt gill-net.....	532
“ fishing.....	8,823	“ bag-net.....	210
Weir licenses.....	93	Salmon permits.....	13
Fish cannery.....	15	Trap-nets.....	365
Anglers permits.....	417	Seine.....	181
Oyster fishery.....	179	Shad gill-net.....	6
Scallop fishery.....	298		

#### RIVER AND INLAND FISHERIES

The importance of preserving the smelt, alewife, shad, salmon and trout fisheries is obvious, the commercial salmon catch alone having a value of over \$200,000, and smelts \$120,000. The continuance and development of these fisheries is dependent on the free and safe access of the parent fish to the spawning grounds of the rivers and headwaters. A very decided improvement in this regard has taken place the past few years. Pollution of the waters from mill refuse and other detrimental deposits have almost entirely ceased. The conditions in this respect as compared with those obtaining some ten or more years ago are marked. The operators of the saw-mills and paper mills on the more important rivers and streams have co-operated in every reasonable effort to prevent pollution of the waters. Obstructions to the free ascent of fish have been removed from many of the principal streams. The character of the artificial fishways constructed are a very great improvement on former types.

In addition to the more vigorous general efforts a number of the principal streams have received special attention, such as the Margaree, the Medway, St. Mary's and the Mersey. The fishways on the latter river have been thoroughly repaired or reconstructed during the past year. The heavy volume of water flowing down this river has made the task of improvement a most difficult one. It is confidently expected that the improvements will greatly enhance the value of the fishery.

The commercial or coastal salmon fishery is increasing in volume and value, due to the improved conditions noted above.

The relation between the prosperity of the salmon fishery and the development of the tourist trade is very close. It is quite essential that the sport-loving tourist be given every facility and encouragement. Nova Scotia should become a popular and prosperous sport fishing district. The salmon sport fishermen comprise a fraternity of the best and most desirable class of tourist, and every effort to improve attractive conditions is fully warranted. The recently organized Tourist Association and kindred bodies are alive to the possibilities in this regard, and are working in close co-operation with the officials of the Fisheries service.

It is not forgotten, however, that while the salmon sport fishery is receiving first attention, the great percentage of visitors to the province are more interested in trout fishing. It is safe to say that for every ten salmon fishermen there are ninety trout fishermen. This is true not only with respect to visiting anglers, but is particularly true with respect to our own native sport fishermen.

Every effort made to improve salmon fishery conditions affects equally the trout fishery, which continues to be in a prosperous condition notwithstanding the constant heavy whipping of the streams each year.

Systematic investigation of the inland waters is now in hand, in order to ascertain the conditions governing successful propagation, as the Fish Culture

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Branch of the department has in hand increased efforts to restock our waters with both salmon and trout.

During the past year more than ten million salmon and trout fry were deposited in the inland waters of the province.

## INCREASED COLD STORAGE ACCOMMODATION

The construction of a new plant at North Sydney for the Cape Breton Cold Storage Company will be completed early in the new year. This plant is of a most modern description and well designed for both the fresh and smoked fish trade. The operations will be under the management of Mr. R. T. Matthews, who has had large experience in the business.

Arrangements have already been made to market the product of the plant, which is expected to speedily reach a maximum, as the prolific fisheries of the district north to Ingonish are easily available for supplies. It is also expected that the operations of the plant will develop the fishing fleet along a considerable portion of the coast.

The Yarmouth plant will probably be completed and ready for business about the middle of the year. This plant is well located, particularly for the American trade. It is hoped that a large Canadian trade may be developed by a favourable commodity rate over the Canadian National Railway on shipments for storage and transshipment. This plant will be of great advantage to the industry of the southwestern shore, as fresh fish shipments for Boston and other American centres can be held in storage at Yarmouth, for quick delivery when the markets are favourable.

## FISHERY PROTECTION SERVICE

The number of boats in this service has been gradually reduced until at present only four are operated, namely the steamers *Arras* and *Arleux* and the gasoline boats *Mildred McColl* and *A*.

The *Arleux*, under command of Capt. Milne, and the *Arras*, Captain Barkhouse, rendered most excellent and valuable service in the protection of the territorial waters, assisting disabled fishing vessels; light ice-breaking to facilitate the movements of the fishing fleet, and in acting as "mother ships" to the winter fishing fleets of small boats operating off Canso and Lockeport. The services performed the past year were greatly appreciated by the fishermen, and assisted to a large degree in encouraging the fishermen to continue the operations during the winter months. With the aid of these ships the catches were greatly increased, and as a consequence the fishermen and the trade generally were directly benefited.

During July and August the *Arras* was in service with the Grand Banks fleet. The satisfaction given was so evident that she will probably be engaged in like service the coming summer.

With special reference to the coastal duties the Captain reports:—

During the year we had sixty-eight American fishing vessels on our station, which we boarded and examined 188 times.

We had fourteen American swordfishing vessels in our waters and seventy-six Canadian swordfishing vessels. These vessels made headquarters at Louisburg during the swordfishing season and some very large catches were made.

With the *Arras* in close touch with the winter fishing fleet out of Lockeport, to assist them in stormy weather, the catch of fish was above the average.

During the year we steamed 13,492 miles, and were at sea 1,634 hours, and consumed 1,092 tons of coal.

The *Arleux* was engaged during August and September in special tidal and survey work off the Labrador straits of Belle Isle district.

The gasoline patrol boat *A*, carrying a crew of four, covers the Western Nova Scotia district, where formerly three boats of a type similar to the *A* were employed, and performed essential service in protecting the lobster and other fisheries of the district, and in assisting the shore officers in the performance of their duties.

The gasoline patrol boat *Mildred McColl*, carrying a crew of four men, covers the large and important district from Lunenburg to Canso, and the Straits district. This boat was in commission from April 3 to January 17, and during the summer months until October 15 was engaged in lobster and salmon protection in Pictou, Colchester, Cumberland and Antigonish counties, where most effective work was performed, especially in Cumberland county west, on the lobster boundary between the spring and fall seasons. After October 15 the boat proceeded to Halifax and Guysboro counties and was engaged in general protection work until the lobster fishing season opened December 1 in Halifax county west. The boat then patrolled the open and closed districts in Halifax county west and Lunenburg county east until she was laid up about the middle of January.

Any successful administration or oversight of the coastal fisheries is due very largely to the facilities afforded by these two gasoline boats, as the work required to be done is in connection with the inshore trap-net, gill-net and lobster fisheries, and along portions of the coast where it would be impossible to employ either the *Arras* or *Arleux*, even if such boats were available when needed.

#### REPORT OF INSPECTOR J. F. CALDER, DISTRICT No. 1, PROVINCE OF NEW BRUNSWICK, FOR 1923

This district comprises the counties of Charlotte, St. John, Albert and the Bay of Fundy watershed of Westmorland county.

The value of the yield of the fisheries of this district during the present year, was slightly less than that of the previous year. The value of the catch in a fresh condition for the present year, is as follows: Charlotte county, \$709,-431; St. John county, \$153,620; Bay of Fundy watershed of Westmorland county, \$4,891 and \$289 for Albert county; making a total of \$868,231, against \$877,845 for 1922.

The value of the products marketed by the fishermen are as follows: Charlotte county, \$598,503; St. John county, \$81,310; Bay of Fundy watershed of Westmorland county, \$4,891; Albert county, \$289; making a total of \$684,992. The fish dealers marketed products to the value of \$685,617, making a total in all of \$1,663,970, against \$1,639,651 for 1922.

#### COD

Twenty-one thousand six hundred and one cwts. of cod were taken this year with a marketed value of \$47,310, against 41,435 cwts. for 1922, with a market value of \$87,317. Practically all these fish were taken on the in-shore fishing grounds. The catch for 1922 was exceptionally large for the district while this year's catch was away below the average. One reason why the catch was so small during the present year, is that owing to the severity of the winter, practically no fishing was done at all until late in the spring. On the other hand, the weather during the previous winter was comparatively mild, with the result that good catches of cod were made.

The principal places where quantities of cod are landed are Chance Harbour and Dipper Harbour in St. John county; Beaver Harbour, Wilson's Beach and Grand Manan in Charlotte county.

## HADDOCK

Four thousand nine hundred and seventy-four cwts. of haddock, with a marketed value of \$11,139, were taken this year, while 2,790 cwts. with a marketed value of \$8,343, were taken in 1922. I have pointed out in previous reports that the catch of haddock was becoming less each year; these reports were in accordance with the facts existing at the time they were made out. I am pleased to report, however, that haddock have been more plentiful during the present year than for any season during the past fifteen years.

## HAKE

Only 17,912 cwts. of hake, with a marketed value of \$18,981, were taken during the present year, as compared with 93,503 cwts. in 1922, valued at \$116,451. This extraordinary decline in the catch is due altogether to the fact that there was very little opportunity for the fishermen to dispose of hake in any part of the district, as the market was glutted with stocks that were kept over from the previous year; a few buyers did take some at Beaver Harbour and Wilson's Beach. At North Head, Grand Manan, which heretofore has been one of the chief centres of the hake fishery, the dealers carried over from the previous year practically all they had bought. As a result of this, they did not buy and during the present year, consequently, the fishermen did not operate.

## POLLOCK

A very small catch of pollock was made during the present year, 28,841 cwts. with a marketed value of \$40,351 against 77,158 cwts. with a marketed value of \$88,633 for the previous year. The large decline in the catch of pollock is due to a scarcity of the fish, for there was a fair market for these fish during all the season. The summer run of pollock was very light, but the fishermen were buoyed up with the hope that when squid made their appearance, which is usually during the first part of August, a good fall run would come in. Unfortunately, they were doomed to disappointment. The run of squid was practically nil, with the result that the fall run of pollock did not put in an appearance. The failure of the pollock fishery was a hard blow to the line fishermen of Campobello, Deer Island and Grand Manan. The failure of the squid to appear is attributed generally by the fishermen, to the unprecedented severe winter of 1923. The winter was so cold and the spring so backward that the ice did not leave our waters until a month or six weeks later than it generally does. I have no doubt that the prolonged low temperature of the water was very destructive to the young fishes, particularly so in the case of the food of the fishes.

## HERRING

The smoked herring business at Grand Manan was a failure during the present year, as very few herring, suitable for smoking purposes, were taken in the weirs. The few that were taken were mostly sold in a fresh condition for high prices to the smoke houses at Lubec, Maine. Large herring were reported from time to time as being quite plentiful in the waters outside of Grand Manan Island, but very few reached the weirs. This is generally attributed to the fact that the natural enemies of the herring, the squid, silver-hake and dog-fish—did not put in an appearance, with the result that the herring did not reach the inshore grounds. The scarcity of herring on the inshore grounds was not confined to this district, by any means. The same situation occurred along the coasts of the state of Maine, and also on the Nova Scotia shore of the bay of Fundy all the way down to cape Sable, and even beyond there. As a result

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of this scarcity of herring in Nova Scotia, many vessels came from there to this district, particularly Grand Manan, to buy lobster bait. Of course, as herring were scarce here, the available supply for bait was limited. However, nearly 6,000 barrels were taken away for that purpose. The Nova Scotia lobster fishermen would certainly have been in a very bad way if it had not been for the supply of bait they procured from our weirs.

#### SARDINES

The catch of sardine herring was very small. 134,494 barrels only were taken, against 244,553 barrels for the previous year. But while the catch for the previous year brought \$296,864, the yield for this year netted the fishermen \$395,968.

Owing to the extreme scarcity of sardine herring the combination, which has for a number of years existed among the canners, in so far as buying their supply of fish is concerned, was broken. During most of the fall months there was very active competition among the canners in purchasing herring from the weirs. As a result of this, our fishermen, for the first time since 1918, got a fair price for their catch.

#### SALMON

There is very little to note in connection with the salmon fishery of the district during the present year. The catch by the commercial fishermen was just slightly less than during the previous year—2,658 cwts. for 1923 against 2,738 cwts. for 1922.

#### CLAMS

Very little of interest is to be noted in connection with the clam fishery during the present year. 13,057 barrels were taken this year against 12,435 barrels during the previous year. The fishermen, however, received slightly better prices for the yield during the present year.

#### LOBSTERS

There was a considerable falling off in the lobster fishery for the present year. The catch was 5,813 cwts., against 7,178 cwts. for the previous year. Good prices were obtained for the yield, and most of the fishermen who were engaged in this branch did fairly well while they were at it.

While the present year has been rather a poor one for the fisheries of the district, there are many circumstances which point to a return of good times in the fishing industry. Generally speaking, a good supply of the different kinds of fish is always available, in their respective seasons, but for the past few years. the fishermen have been held down by lack of market for their products. The breaking up of the combine of the sardine canners means much to our fishermen, as the sardine fishery is the most valuable one we have. It could not have been much longer continued, with such prices as were paid during the four previous years. Then again, the old stocks of line fish are being got rid of, and 1924 finds us with very little old stocks on hand. It looks as if there would be a good demand for all kinds of fish during the coming year. If these expectations are realized, a large increase in the catch may be confidently looked forward to.

#### PATROL BOAT "PHALAROPE"

Patrol boat *Phalarope*, Captain Kelly, went in commission on April 1, and was on duty until February 15. The boat was principally engaged up to the end of the open season for lobster fishing, during the spring season, in having

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the size limits for lobsters in the different counties observed. During the close season for lobster fishing, the services of this boat were valuable in preventing illegal fishing; all traps found set during the close season were confiscated and destroyed forthwith.

Owing to the high prices being paid for sardine herring, repeated attempts were made to violate the herring fishery regulations in many places in Charlotte County by the use of drag-seines and also by "driving." The *Phalarope* did good work in suppressing and breaking up such practices, especially at Deer Island.

The *Phalarope* covered about 6,166 miles during the season.

## PATROL BOATS "TOGO" AND "SHANNON"

The patrol boat *Togo* was used from April 1 until October 31. On November 1, the *Togo* was returned to her owner, and the *Shannon* was hired. The *Togo* was a very good boat, but the engine in her was not satisfactory and we were therefore compelled to procure another boat. The *Shannon* has a splendid engine, and is a very satisfactory boat for the service. Captain Joy was in command, and has proven to be a very energetic and efficient officer.

The chief work of this boat is the enforcement of the lobster fishery regulations. Owing to the great extent of the lobster fishing grounds off the main island of Grand Manan and the islands and ledges adjacent thereto, coupled with the fact that the United States market for small lobsters is so close at hand, the duties of this officer are by no means easy. However, Captain Joy is doing everything that he possibly can towards having the regulations observed. I feel sure that the present service is an improvement over any previous service.

During the winter there has been a considerable amount of "driving" for herring around the upper part of Grand Manan island, and Captain Joy is devoting practically all his time in an effort to break up this business.

## STATEMENT SHOWING LICENSES ISSUED IN DISTRICT NO. 1

Lobster fisherman's.....	653
Fish cannery.....	6
Salmon fishery.....	77
Shad gill-net or drift-net.....	46
Scallop fishery.....	23
Herring Weir.....	552
Permits to dig soft-shell or long-neck clams.....	120
Special lobster pound.....	5
Lobster pound certificates.....	239
Lease of dark harbour.....	1
<b>Total.....</b>	<b>1,722</b>

## REPORT OF INSPECTOR R. CROCKER, DISTRICT No. 2, NEW BRUNSWICK, FOR 1923

District No. 2 comprises the counties of Restigouche, Gloucester, Northumberland, Kent, and the strait side of Westmorland county.

The returns show the value of fish taken to be \$1,922,423 as against \$1,803,695 for the previous year, an increase of \$118,728, showing a very gratifying improvement in the operations over the preceding two years.

## COD FISHING

This is a decrease over the previous year of some 5,307 cwts. of which 19,850 cwts. belonging to the district of Overseer Landry and is accounted for because of the fact that during the first of October a very heavy storm pre-

vailed, causing a number of fishing vessels to come ashore. This being late in the season the fishermen did not take the trouble to launch their vessels again. Another factor which interfered perhaps with the cod fishing was that wages in the lumber woods were very good and many of the men left fishing early for the purpose of proceeding to the lumber woods. Doubtless thousands of dollars were lost to the fishermen because after this storm of the first of October unusually good weather prevailed for fall fishing.

#### MACKEREL

This fishery shows a large decrease, the 1922 catch being 23,441 cwts., while this year's catch was 13,455 cwts., with a corresponding marketed value of \$54,054. The decrease in this was accounted for partly by the fact that there was a smaller run of mackerel on this coast, but more particularly to the fact that the price paid to the fishermen was less than the previous year. During the fall of this year very good catches of mackerel were taken on the United States coast, and these catches affect the selling of the frozen mackerel from our district.

#### ALEWIVES

This fishery also shows a decrease in quantity taken, which is accounted for by the poor demand for salted alewives. Greater quantities could have been taken had there been any prospect of a market as for some days the fishermen emptied their nets allowing the fish to go. A considerable quantity of pickled fish are carried over into 1924 and will doubtless effect the operations of this fishery for the season of 1924.

#### SALMON

There was an increase in the catch of 3,972 cwts. over the previous year, but the average price to the fishermen in 1922 was \$11.96 per cwt., while this year the average price was \$9.48. This fishery also, so far as the shipments to the United States points are concerned, has to meet a duty of 2 cents per pound, which if added to this year's price would bring the price per cwt. to the fishermen nearly equal to that of 1922.

#### SMELTS

This fishery shows a decrease in quantity of 19,578 cwts. as compared with the previous year, but shows an increase in value of \$21,211. The prevailing price for smelts during the earlier part of the year was exceedingly high and during December they also ran quite high. I am of the opinion that the prices prevailing for this year are perhaps the highest in the history of the fishery, the average price for 1923 being 11 cents per pound, while that of 1922 was 7.21 cents per pound.

#### LOBSTERS

The catch shows an increase of 5,499 cwts. The early season showed an increase in every district, excepting that of Miscou and Shippegan islands, and a small section of Overseer Arsenault's district at Green point. The outlook at the beginning of the season for canned lobsters was very good but as the season went on prices dropped materially and went as low as \$18 per case, as compared with \$26 at the opening of the season. During the late season, in view of the fact that the price of canned lobsters had fallen off to such an extent, a much larger quantity of lobsters were shipped alive to the United

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States markets. Unless a prohibitive duty is put on by the United States doubtless we will see a greater quantity of lobsters shipped alive as years go on. The shippers have given the matter considerable study and are now much better prepared to take care of them and pack them so that they will arrive in good condition in United States markets. The prices prevailing to the fishermen were very well maintained throughout the whole season.

## OYSTERS

This fishery shows a large increase as compared with 1922, 14,574 barrels, value \$67,123, as compared with 10,708 barrels, value \$53,447, for the year 1922. During the fishing season the weather was exceptionally fine, thus enabling the fishermen to go on the beds practically every day. A fairly ready market was found with good prices prevailing to the fishermen.

## SHAD

This fishery shows an increase of about six and one-half times that of the previous year, 1,394 cwts. for 1923 as compared with 202 cwts. for 1922. Fishermen report that they have never seen shad so plentiful for many years.

Reviewing the whole year's operations I submit they have been very satisfactory. Losses occurred to the fishermen, particularly to the lobster fishermen, during the storm of October 1. The storm was very heavy in the vicinity of Point du Chene, doing considerable damage to the wharves and buildings situated on the wharves. One firm estimates their loss at \$15,000.

At Richibucto, I am pleased to report that a new freezer 150 feet by 40 feet with a correspondingly large ice house of 60 feet by 80 feet has been erected during the latter part of the year by the Messrs. A. and R. Loggie Company, Limited. Since the disastrous fire of 1921 this town has been without an up-to-date freezer and it is very encouraging that this firm have sufficient faith in the business to re-establish at this point.

During the year patrol "C" did some prospecting with a view to ascertaining to what extent scallops could be procured in the waters surrounding Shippegan and Miscou islands and in the Caraquet district. In the latter district the evidence produced was very satisfactory, and in discussing the matter with one of the fish merchants at Caraquet during the latter part of the year he felt that the prospects as shown by the work of the patrol "C" justifies an entrance into the business and purposes, during the season of 1924, to carry on the fishing. It is the intention to have the overseer do more prospecting in this district, and if the evidence procured corresponds with that procured by patrol "C" I would hope to see some important developments in this fishery.

## REPORT OF INSPECTOR H. E. HARRISON, INLAND FISHERIES OF NEW BRUNSWICK FOR 1923

The Inland District of New Brunswick comprises the counties of Kings' Queens, Sunbury, York, Carleton, Victoria and Madawaska.

The winter fisheries of this district do not amount to a great deal, even under favourable conditions, and the first three months of 1923 were exceedingly unfavourable for the few fishermen who attempted to follow winter fishing, an excessive amount of snow and bitterly cold weather prevailing during that time.

## ALEWIVES

	Cwt.	Value caught	Value marketed
1922.....	998	\$ 2,495	\$ 2,933
1923.....	875	2,188	2,188

The earliest spring fishing, after the rivers and lakes become free of ice, is the alewife fishery, formerly carried on very extensively by professional fishermen and farmers in all of the waters of the St. John river system between St. John and Fredericton, and, to some extent in the St. John river well up to the Grand falls by farmers mostly who could spare the time, or had sufficient help in their homes to spend two or three weeks operating alewife nets and shipping the fish to St. John. A very great change has taken place during recent years and the spring runs of alewives during recent years have not been good.

## BASS

	Cwts.	Value
1922.....	6	\$ 90
1923.....	17	255

The sea-bass fishery is of little importance, with the exception of two or three years together, long periods apart. For some reason or other these periods do occur, and large quantities of sea bass are taken in some of the lower tributaries of the St. John river, more particularly in Belleisle bay, Kings county. A considerable number of very large sea bass ascend the St. John river to a distance of one hundred miles north of St. John harbour during the summer, and an occasional one is taken in the salmon nets along the river, but no one is permitted to have nets set for them during that time.

## PICKEREL

	Cwt.	Value
1922.....	242	\$ 2,420
1923.....	1,635	16,350

A very remarkable showing is made in this fishery for 1923—nearly 700 per cent increase over that of 1922. I am unable to give any specific reason for this condition, other than that pickerel appeared to be much more plentiful.

## SALMON

	Cwt.	Value
1922.....	424	\$ 9,752
1923.....	355	8,165

Compared with 1922, the salmon fishery shows a decreased catch of 69 cwts., and the catch of 1922 showed a decrease of 151 cwts. compared with the 1921 catch, but the 1922 and the 1920 catches were practically the same. Regarding the 1923 catch, I was not at all surprised that the catch was not larger, having kept fairly well in touch with conditions throughout the season, and I was rather surprised to find that that amount had been taken during the fishing season. In the spring of 1923 we had one of the greatest spring floods known in the history of the St. John river valley, consequently, the salmon fishery particularly on the lower part of the river, was not good during the early part of the season. Then, because of an almost rainless season, the river ran very low and this again affected the lower St. John more than the upper parts. As is generally known, all salmon fishery nets—both tidal and non-tidal—in these waters are set from the shores, or banks, of the river and they extend out a very short distance, while much of the river is very wide, consequently, when the water is low salmon keep to the deeper parts and escape the nets to a great extent. Kings and York counties are the two large salmon producing sub-districts, but the York county district was not so materially affected.

It is unhesitatingly conceded by men whose work is on the water that there are far more salmon in the St. John river during recent years than there were twenty-five or thirty years ago.

## SHAD

	Cwt.	Value
1922.....	1,224	\$ 7,344
1923.....	792	4,752

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The only anxiety I have regarding the fisheries of this district is in connection with this fishery. Notwithstanding the fact that the matter of our supply of shad, and the future of the fishery, were given very serious consideration during the time that the general fishery regulations were under consideration (1921), and the further fact that the 1922 regulations curtailed to a very large extent the operations of the fishermen, the fishery appears to be on a decline again, unfortunately, as the shad is one of our finest fishes.

## STURGEON

	Cwt.	Value
1922.....	111	\$ 2,442
1923.....	100	2,000

While the sturgeon fishery is not productive of a large amount in hundred weights, it is at present the fourth in value in this district. This is because of the apparent high appreciation of the flesh of this fish on the New York market. The 1923 season was about an average one. While a large proportion of sturgeon taken were comparatively small fish—40 to 50 pounds weight each—some very large fish were taken.

The total marketed value of the commercial fish in this district during the last two years is as follows:—

Year	Value
1922.....	\$ 25,356
1923.....	33,924

## MATERIALS

	Value
1922.....	\$ 21,644
1923.....	16,845

## DOMESTIC FISHERIES

	Cwts.	Value
1922.....	467	\$ 8,819
1923.....	426	7,325

There was a considerable decrease in the quantity of salmon taken by anglers, compared with the amount so taken during 1922. Anglers on the St. John, Tobique, and part of the Southwest Miramichi rivers had a very satisfactory season, but the upper waters of the latter river, in Carleton county, fell off very badly from 116 cwts. in 1922 to 24 cwts. in 1923.

This condition was, to a considerable extent, caused by the unfavourable water conditions. After the spring freshet the weather was dry and warm and the upper waters of the Miramichi river evaporated and ran off until it was difficult to run even a light log canoe in many places, and this lasted for several weeks, consequently, salmon found it difficult to reach the upper spawning areas of this water, and very large numbers did not do so, but remained in the deeper water and spawned some twenty or more miles below.

The regulations (authorized in 1922) allowing limited net fishing in a goodly portion of the Miramichi river were very well observed during that season, and, in addition, there was a very heavy freshet in that district during the latter part of June and early July, 1922, so that all obstructions were removed and tens of thousands of salmon and grilse found no difficulties obstructing their way to the upper water of the river, and the result was very excellent angling during 1922.

The Tobique river did not produce quite as much salmon in 1923 as it did in 1922. So far as I can gather, this was not because of weakness in the protective service on either the St. John or Tobique rivers. The riparian owners, and the lessees of the fishing waters of the Tobique river advise me that there

were sufficient numbers of salmon in the river, and that from early summer, but the water was low and the weather was bright and warm during much of the season, and fish simply would not rise to the fly.

The experience of salmon anglers in the vicinity of this place (Fredericton) was very remarkable during 1923. At a pool in the St. John river, within five miles of my office, over four hundred salmon and grilse were taken by anglers during the season, as compared with less than one hundred in 1922. The water was fairly low during a good portion of the season, as it was in 1922, and the fish appeared to stop at this place to be captured. The guardian who was stationed at this place during the summer of 1923 deserves praise for his efficiency and faithfulness in preventing illegal net fishermen operating.

Reports submitted by the sub-district officers covering their several districts indicate a slight betterment in the trout fishing, compared with the previous season. The factor of weather and water conditions enter into this class of sport fishing as well as that of salmon fishing by anglers, so that it is difficult to compare one year with another. I tried to keep in touch with conditions during the season, and reports coming to me were that trout fishing was excellent in some streams and lakes, and not good at other places.

#### SEARCHING FOR PARENT TROUT WATERS

Some efforts were made by my officers and myself during the season to locate areas where parent trout gather to plant their spawn, in accordance with instructions from the department. While no very great success attended our efforts, I think we got some information that, if followed up, may be of value.

On one section of the Miramichi river and a tributary, one very likely place was located and a few fairly large trout (16-inch fish) were taken. We ate these fish, but when dressing them we found that a large percentage were barren, containing neither eggs nor milt. These were sea trout and well up the Miramichi river.

#### SUB-DISTRICT OFFICERS

The sub-district officers in my district have been diligent, and have done all in their power to prevent infractions of the fishery laws, and have had a good degree of success, I am sure, and, notwithstanding the goodly quantities of fish taken from these waters—both harbour and inland—with the exception of the shad fishery, which I am anxious over, the fisheries generally are holding their own, and in some instances more than holding their own.

The matter of the pollution of the waters in this district is not now a serious matter. Time was when conditions were anything but good. The matter of the mill men using the rivers, lakes and streams as a means of getting rid of the waste from their mills was a practice of long standing, in fact, from the time of the earliest settlement of the lands, and continued so for a number of years after my appointment, but by a gradual process of education matters were considerably mended, and when the reorganization was completed in 1918 the newly selected local officers found a fairly good foundation laid, and with their assistance we went to work in a united manner and at the present time every man operating a mill knows just what to expect if he attempts to revert to the former method of disposing of his mill waste, and I assure you he is not disappointed in his expectations when it is possible for us to secure any evidence of the infraction. He would very quickly revert to the old method if it were not for the constant watchfulness on the part of the overseers. During 1923 there were fourteen evidences of infractions of this regulation, out of hundreds of mills in my district, and fourteen prosecutions followed, mostly for minor offences, eight first and six second offence cases and convictions were made in each case.

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A modern concrete fishway was constructed in the dam owned by the Nashwaak Pulp and Paper Company on the Nashwaak river at the town of Marysville, York county, during the autumn of 1923. This was built in place of a wooden fishway (on the opposite side of the river) which had been carried away during the spring freshet of 1923. The expense of the new pass was borne jointly by the department and the Nashwaak Pulp and Paper Company. It was not completed until late autumn, therefore, the large number of salmon which ascended that river about the first of October were unable to pass beyond the dam. The fishway appears to be a substantial and well built affair, and I think it is now in the right location for salmon to use, which was not the case with the former pass. Salmon do not ascend the Nashwaak river (with the exception of only an odd fish) every year, and very few ascend that river before autumn during any season. Practically none ascended during 1922. Large numbers did so (to the dam) in 1921 and 1923. The water conditions appear to be the controlling factor. While the river was very low during 1922 and 1923, in the latter year about the 1st of October, a considerable quantity of lumber (logs) was brought down the river by flushing with water held at the upper parts of the river, each day. As soon as this work began, salmon began to ascend the river, and it is the opinion of your department's engineer and others, that the flushing (fresh water being let out, or forced out) each day attracted the salmon. A heavy rain in the Nashwaak valley in the autumn has the same effect and then salmon will ascend the river.

Prosecutions for all offences during 1923 numbered twenty-six, as against fifty-three in 1922. Confiscations numbered twenty-six, as against thirty-five during 1922, and prosecutions followed in every instance where evidence connecting any person or persons with the offence could be established. Seizures consisted mostly of salmon nets, with a few shad and whitefish nets. All illegal or valueless-to-sell materials were destroyed. Legal materials that could be were sold. Some nets are still held and it is expected that these will be sold when fishing opens up again in the spring of 1924.

Moneys collected in the way of fines during the year amounted to the sum of \$613.50. In addition, fines to the amount of \$330 were imposed, and the penalties suspended pending good behaviour on the part of the offenders.

## FISHERY LICENSES AND PERMITS

The following licenses and permits were issued by me during the calendar year 1923:—

	1923	1922
Salmon fishery licenses.....	105	112
Salmon net fishing permits (nontidal).....	129	123
Shad gill-net or drift-net licenses.....	219	254
Bass fishery licenses.....	15	18
Sturgeon fishery licenses.....	11	9
Smelt gill-net licenses.....	1	1
Whitefish fishery licenses.....	Nil	10

## REPORT OF INSPECTOR S. T. GALLANT, PROVINCE OF PRINCE EDWARD ISLAND AND MAGDALEN ISLANDS, FOR 1923

Owing to unusual weather conditions the ice did not leave the shores until well on in May; consequently lobster fishing did not become general until May 18. Fine weather followed and a normal catch was obtained, with the exception of that part of the coast from Nail Pond to Victoria where the catch was one-third less than that of last year. There was no loss of gear. The fishermen received good prices, especially in Prince County where a large portion of the catch was sold in the shell and fancy prices realized. On the whole the season might well be termed a successful one.

In 1923, in comparison with 1922, there was an increase of ten (10) canneries, with an increase of 76,189 traps. As a result of the decrease in the market value of canned lobsters I do not anticipate that this fishery will be carried on to the same extent in the season 1924.

Spring herring fishing was good yielding an increase of 13,897 cwt. The canneries, therefore, were well supplied with bait during the entire season.

The codfish industry suffered a decrease of 4,202 cwt. due, no doubt, to the low prices offered at the opening of the season. A large number of fishermen left the Province to secure more lucrative employment elsewhere. The fish were very plentiful all summer and towards the latter part of the season good prices were realized, so that those who followed up this fishery were well paid for their labour.

There was an increase of 32 cwt. in the haddock catch and a decrease of 4,772 cwt. in hake and cusk.

Although spring mackerel were plentiful the fishermen did not fish to any extent on account of the low prices offered in the American Market and the high cost of transportation; the duty, too, was quite a factor in discouraging fishermen from shipping to the above-mentioned market. Quite a few mackerel were caught with hook and line in Queens county, and good prices were obtained for same.

There was a decrease of 1,176 barrels of oysters this year, due to the fact that there were 79 fishermen less fishing this season. The buyers were very particular in purchasing only full-sized oysters; consequently the demand was good throughout the season and fancy prices were realized. East and West rivers, and tributaries, also Vernor, Seal and Orwell rivers are well stocked with young oysters and we are looking forward to a good catch next year. When going over the oyster beds in Richmond bay, one-, two-, and three-year-old oysters were examined and found in a healthy condition, but the beds are so badly silted that the spat cannot catch and before these beds will become productive, they will have to be cleaned. It is our intention next summer, with the help of a few local men, to clean part of a bed and deposit two or three barrels of oysters on same in order to ascertain whether or not the blight still exists. This, I think, is a good move, as the department would scarcely be justified in spending money cleaning the beds until it was a positive fact that the oysters would not contract the disease which has been prevalent in the rivers of Prince County for the last seven or eight years.

There was an increase of 15 cwt. in the catch of salmon, Morell, Kings county, being the only place where this fishery was carried on. This increase is due to the fact that the fishing season was extended from the 15th to the 31st August. It is expected that there will be further development in this fishery in the near future as salmon were quite plentiful after August 15 in at least a dozen of the streams. Alberton, New London, and Richmond bays are well suited for salmon fishing. The fishermen at Morell received from 20 to 25 cents per pound for their catch last season and this should be an inducement for others to engage in this valuable and profitable fishery. For fishing at Morell three nets of 20 fathoms each are used, a pound is made of one net, while the other two are used as leaders; the total cost of these nets is about \$75, but, in view of the great demand for salmon and the high prices paid for same, this should offer no difficulty to those engaged in this fishery. I, therefore, anticipate considerable development in this industry within the next two years. A few salmon were caught by angling but there is no means of ascertaining the exact number caught.

Smelt fishing was good; the fish were large especially those caught with gill-nets. There was an excellent demand for them, and those engaged in this

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fishery were well paid for their time and labour. Bag-net fishing was delayed as the ice did not make in the rivers until the last days of December. Heavy catches are reported for the first two weeks of January from all parts of the province.

## FISHERIES PROTECTION SERVICE

I am pleased to report that there was very little illegal lobster fishing this season. The new system of protection inaugurated last spring, that of long-term guardians patrolling the shore from West Point to Richmond bay, afforded splendid results, and, if the same system is employed for another year or more, there is no doubt that illegal lobster fishing in this Province will be a thing of the past.

## FISHERIES PROTECTION SERVICE BY PATROL BOAT "RICHMOND"

The patrol *Richmond* was in charge of Captain Thomas Baglole and Assistant Fred. McKinnon, and began her patrolling duties on July 12 after being made ready for sea she continued patrolling until December 14, when she was laid up in her winter quarters at Ellis river.

The following seizures of lobster gear were made:—

Year	Rope	Traps	Crates	Anchors
1923.....	1,400 fath.	192	2	7
1922.....	2,900 "	688	..	..

It will be noticed that there is a considerable decrease in the amount of gear seized which may be attributed to the fact that the patrol *Richmond* rendered most efficient service, successfully frustrating at the outset any attempt made at illegal fishing. I may safely say that so long as Captain Baglole and his assistant are in charge of the above-mentioned patrol there will be very little illegal fishing carried on in Richmond bay.

## MAGDALEN ISLANDS

The lobster fishing season opened on May 1 but did not become general until May 24, as the ice did not leave the shores until around May 20. A period of fine weather followed resulting in an increase of 3,723 cwt. over last year's catch.

By reason of the improved sanitary conditions and the up-to-date equipment installed the canneries in the Magdalen islands may well be numbered among the best in the Maritime Provinces. Several new canneries have been built and equipped with the most modern conveniences, and the goods put up by the Magdalen islands packers are of a highly satisfactory quality.

There is an increase of 4,266 cwt. in the catch of cod to report. The catch was quite satisfactory to those engaged in the fishery, there being an exodus of some 125 fishermen from the islands immediately after lobster fishing closed.

Herring, as usual were plentiful but as there was very little demand for them we have to report a decrease of 20,374 cwt.

There was very little demand for mackerel, although they were plentiful in June, and there was consequently a decrease in the catch of 13,419 cwt. The bulk of the catch was split and salted, and the quality was far superior to that of last year.

I have to report a decrease of 555 barrels in the catch of clams.

## TRANSPORTATION

It is pleasing to note that a better boat will be placed on the Pictou-Souris route this season. This no doubt, will improve transportation facilities and be an encouragement to the fishermen to engage in the various fisheries on a still larger scale.

## HARBOUR FACILITIES

On the north side of the islands, where the best codfishing grounds are located, there are no harbours which afford shelter to the fishing boats. It is estimated that some 2,000 quintal more codfish might have been landed at Etang du Nord last year had there been harbour accommodation at that point.

## REPORT OF J. B. SKAPTASON, INSPECTOR OF FISHERIES, PROVINCE OF MANITOBA, FOR THE YEAR 1923

In a general way the year just passed may be considered reasonably successful for both fishermen and dealers. Practically the only exception is that of the summer whitefish operation on Lake Winnipeg from June 1 to August 15, which was a loss to both fishermen and companies operating. The only other variety of fish to show a decrease in production is the winter catch of tullibee. This, however, was very largely compensated for by the much higher prices that obtained than the previous year. All other varieties show a marked increase, and while these increases do not make up for the decrease in whitefish and tullibee, rather leaving the actual production for 1923 over two million pounds short of 1922, the amount realized by fishermen is shown to be nearly eighty-two thousand dollars greater, and the actual market value one hundred and eleven thousand dollars more for the catch of 1923 than that of 1922.

A very definite and valuable increase is indicated in sturgeon fishing, which is fully double that of the previous year. The increase is only partially accounted for by the greater number of licenses issued and men fishing, 183 as against 137 in 1922, or about 25 per cent more, while the increased production is fully 50 per cent greater. The demand for sturgeon was very good, creating a top price, giving each licensee a much higher average, or \$340 per license in 1923 as against \$162 in 1922. This fishing is largely carried on by Indians in a desultory sort of way with small and inefficient outfits, during two or three months of the summer, the results obtained by each man may therefore be considered reasonably lucrative.

Special attention is given all sturgeon fishing grounds in this inspectorate, with a view to watching for possible depletion. It is gratifying to be able to report, all these fisheries appear to be well supporting their various limits.

*The Pas, Sub-District*, comprising all waters north of 53 parallel excepting the northern parts of lakes Winnipeg and Winnipegosis, shows no summer fishing during 1923, excepting for sturgeon. This was carried on to a marked degree more extensively than in late previous years, with much increased individual results. The increasing of the limit on the Saskatchewan river and its expansions from 50,000 to 65,000 pounds, appear to me fully justified.

Winter fishing in these waters was carried on in a slightly lesser degree than previous year, the production, however, is slightly greater than that of the preceding winter. The reason for the light winter operation is accounted for by the very high cost of freighting the fish to railhead, as teams, and fodder for them, have to be shipped into the district.

*Lake Winnipeg*.—There has been an unaccountable falling off in the production of whitefish during the past two summer seasons on lake Winnipeg. The limit for the season which extends from June 1 to August 15 is 3,000,000 pounds. The following is the catch for the past three seasons:—

1921  
2,927,098 lbs.

1922  
2,472,470 lbs.

1923  
1,455,404 lbs.

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It is not generally considered there need be any fear entertained, that this is an indication of depletion, rather the fish failed to school and kept scattered at various depths of water, making it more difficult for the fishermen to locate them. During the fall pickerel fishing, carried on in that portion of the lake lying south of Black Bear island, there has been a very noticeable increase in the whitefish catch all along the line, some places at times reporting from 10 per cent to 20 per cent whitefish as against pickerel, where a few years ago whitefish would hardly be seen during the whole season. This is generally ascribed to the Gull Harbour hatchery which is situated in the centre of this area.

Sturgeon fishing on this lake was carried on more extensively than in late previous years, and more than doubling the production of 1922. Sturgeon appears to be keeping up fairly well with the limited fishing carried on in the lake. A small attempt was made during the past summer at hatching of sturgeon eggs in Playgreen lake, no success was met with, in fact owing to the special adverse local conditions it was not found possible to obtain the parent fish in proper condition. The officer who had charge of this experiment, Mr. C. P. Paulson, Superintendent of the Gull Harbour hatchery, is confident the experience gained last spring will materially improve chances for success another year, and it is contemplated to make another try this coming summer at Berens river.

*Lake Winnipegosis.*—This lake enjoyed a normal season and a fair output. No summer fishing for whitefish was carried on, but during the fall season for pickerel, 166,000 pounds of whitefish was produced on what is not generally considered whitefish grounds. There is a feeling amongst the fishermen that whitefish is improving in the lake.

Last spring (1923) the department in response to a petition of fishermen, made a decided attempt at reducing to some extent the suckers or mullets in lake Winnipegosis. These fish have become a serious menace on the whitefish spawning grounds of the lake. The work was carried on under the direction of S. J. Walker, Inspector of Hatcheries. Three of the principal streams in the south end of the lake up which these fish run in spawning season, were blocked and all the fish taken. An offer of the department to transfer the fish to lakes on the Prairies that had no fish life was well received, and a large number of these fish were so disposed of throughout Manitoba and Saskatchewan.

*Lake Manitoba.*—The green fish industry is much on the increase throughout the west, all lakes where railway facilities are such as to allow of the fish being shipped fresh become very popular with fishermen, who are inclined to over-crowding in these waters. Lake Manitoba this present winter season is supporting practically 800 fishermen, or almost half the winter fishermen of the province, about 75 per cent of that number are operating in the comparative small area south of the narrows on the lake. The increase in fishermen on this lake as against winter 1922-23 is about 30 per cent. This is a comparatively small lake with no great depth of water, and it is unthinkable that it can indefinitely support the tremendous drain it is subjected to. It is, therefore, felt the now proposed hatchery for this lake cannot be put into operation a day too soon.

We had a visit during the past summer from Mr. Wm. A. Found, Director of Fisheries Service. It was the occasion of a get-together movement amongst fishermen as well as operators, and several very representative meetings were held by Mr. Found, and those directly interested in the industry. This was also an opportunity used by the Director of Fisheries to make a most thorough inspection of the various fisheries on lake Winnipeg, as well as the hatchery conditions on the lake.

All the officers of the district have shown commendable diligence in the performance of their duties.

During the year there were twenty-three prosecutions under the Fishery Regulations in the province, as follows:—

Fishing without license.....	6
“ in closed season.....	3
“ with illegal mesh nets.....	3
“ in weekly closed time.....	2
“ by means of explosives.....	3
Possession of fish closed season.....	6

## REPORT OF G. C. McDONALD, INSPECTOR OF FISHERIES, PROVINCE OF SASKATCHEWAN, FOR 1923

The total catch for the year shows an increase of 5,751 cwts. over the previous year. The catch during the summer season has increased 2,239 cwts., and the catch during the winter season has increased 3,512 cwts. This increase of both summer and winter catches is due to more fishermen operating in almost every district in the province, there being an increase of 165 fisherman licenses issued during the year. The winter fishing season was delayed from ten days to two weeks during December on account of the unusually mild weather, resulting in there not being sufficient ice on the lakes to allow the fishermen to operate.

There is an increase shown in the value to fishermen of \$30,608, and an increase in the market value of \$41,306 due to larger production. The price obtained by the fisherman as well as the market value was about the same as during the previous year.

There has been an increase of 165 fisherman commercial licenses issued during the year. This is probably due to the low price obtained by the farmers for their produce as well as the increased demand for fish.

There are no waters showing any immediate signs of being depleted that would require any special restrictions during the near future, except probably Dore lake and Okemasis lake. During the last few years Dore lake has accounted for the largest production of fish of any lake in the province, and if the number of licenses issued on this lake continues to increase it might be found necessary to place a limit on the total production. This matter will receive attention at the close of the present winter fishing season, when more information will be available. Okemasis lake has been fished considerably during both the summer and winter seasons for a number of years, on account of its close proximity to the railroad, and if this strain continues on the lake it might be found necessary in the near future to place a limit on it also, and owing to its being so conveniently near the railroad I might suggest the placing of a generous quantity of whitefish spawn in it from the hatchery.

During the year there were seventy-six prosecutions and a conviction secured in every case, resulting in fines amounting to \$387.50, being imposed with additional costs on the defendants of \$265.60, according to the following:—

Fishing with nets without a license.....	8
Fishing during close season.....	32
Fishing with illegal apparatus.....	28
Illegal possession of fish.....	5
Selling fish taken under free permit.....	1
Damming of streams.....	2
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There were sixty-eight confiscations and forty-four sales of confiscated articles made during the year.

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Of the twenty dams reported during the year five of these were repaired and two new fishladders built in the Carrot river and Stoney creek dams. All fishladders in dams in the province are now reported to be in good condition.

Under equipment there is an increase shown for the year of 392 gill-nets due to more fishermen operating. There is also an increase shown of six gas boats, ten rowboats, two ice-houses, and three piers all on Turtle and Jackfish lakes and used in connection with the summer's operations. There is a decrease of six smoke-houses on Jackfish, Turtle and Dore lakes.

Reports show that during the year there was an increase of 1,803 cwts. of fish, with an increased value of \$9,938, taken under domestic license. This is due to there being an increase of 179 domestic licenses issued during the year.

There is also an increase shown of 4,836 cwts. of fish taken by anglers with an increased value of \$40,700. This is reported due to there being an estimated increase of 4,022 anglers.

### REPORT OF R. T. RODD, INSPECTOR OF FISHERIES, PROVINCE OF ALBERTA, FOR 1923

A total amount of 51,862 cwts. of all kinds of fish were caught in the district of northern Alberta during the summer and winter seasons of 1923, an increase over the year 1922 of 6,173 cwts. Increased catches may be noticed in both trout and whitefish as well as the coarser varieties. The increase in trout is found chiefly in the lac la Biche district. An increase of about 2,000 cwts. of whitefish is accounted for by the following lakes: Primrose lake (Cold lake district), where a larger number of men operated, and the fishing was exceptionally good. Pigeon lake, also chiefly due to more fishermen operating. This lake is in a particularly healthy state. Moose lake and Athabasca lake district. The fishing in Fawcett lake and Calling lake was excellent. The above lakes were operated during the winter seasons. In the summer increases are noted in lac Ste. Anne, Wabamun, lac la Biche and Cold lake districts. It is most gratifying to note that Wabamun and lac Ste. Anne are again showing an increase in catch, and this can be accounted for by the heavy rains of the summer of 1923, which helped to raise the abnormally low waters of these two lakes. An increase will also be seen for Cold lake, which was fished for the first time on a commercial scale during the summer months.

A decrease in the catch of Lesser Slave lake is noted during the summer of 1923, where the maximum amount of 15,000 cwts. of whitefish fell short by 1,460 cwts. The maximum amount could easily have been obtained were it not for the fact that operations were suspended for a week at the opening of the season, owing to the phenomenal catch of the first week, which taxed the shipping facilities to the limit. After the first two weeks or so the fish scattered over the lake and the fishing was very poor. I recommend that the catch for this lake be restricted to a maximum of 10,000 cwts. instead of the present quantity.

During the winter it was also noticed that the catch of whitefish at Buffalo lake showed a large decrease, which can be accounted for through the serious delay in the commencement of fishing in December, 1923, owing to the exceptionally mild weather and lack of snow. Ice did not form in sufficient thickness to allow of fishing until the third week in December, and then only with great danger and difficulty. Indeed several of the companies operating lost horses through the ice breaking whilst hauling fish to the shore. Reports indicate, however, that in the latter part of the season 1923-24 the fishing at this lake was very good, and from the account received in this office there is no reason to believe that this lake is in anything but a fine condition. A decrease

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is noticed in the Cold lake district in the catch of trout, although there were a greater number of fishermen fishing. This lake is considered to be in a depleted condition, and the department has now placed a limit on the amount of fish to be taken. A decrease in the Trout lake district resulted through no operations around lac la Biche and a smaller catch on Winifred and Christena lakes, not as many men operating on these lakes as formerly.

#### MARKETS

The markets during the year 1923 were exceptionally good, and keen competition between the various buyers was evinced, with a consequence that the fishermen obtained excellent prices. As high as 9 cents per pound was obtained in some cases for whitefish. Further an excellent market is now assured for lake trout, formerly difficult to dispose of in large quantities.

#### TRANSPORTATION

Transportation facilities show still more improvement both by the Edmonton and Dunvegan Railway and Alberta and Great Waterways Railway. During the summer two carloads of fish were upset on the former railway, but such was the assistance given that within twenty-four hours every pound of fish was on its way again to Chicago, and not a pound was lost. The latter railway proposes to assist in the breaking of a new trail to Buffalo lake on a lower elevation, that will decrease the now heavy overhead expenses to very appreciable degree, and will prevent the loss of fish on the trail.

#### EQUIPMENT

Further improvement is shown in the equipment, a larger number of gasoline boats being used at Lesser Slave lake, as well as deeper mesh nets. More attention is now being shown towards the cleaning and marketing of fish in good condition.

#### OBSERVANCE OF THE REGULATIONS AND PROSECUTIONS

There were twenty-six prosecutions of which two were appealed, and the court sustained the appeal with the result that the confiscated articles were ordered returned to the parties prosecuted by the department. Saw-mills have been warned regarding the pollution of streams and a great deal of attention has been shown this class of offender. The following is a list of offences:—

- 3 fishing without a license.
- 2 leaving remains, and offal on the ice.
- 1 fishing without domestic license.
- 5 fishing without angling permit.
- 5 fishing with apparatus other than gill-nets, etc., contrary to section 27.
- 1 killing under the size limit.
- 4 fishing in close season.
- 2 fishing with excess of net.
- 2 fishing with mesh less than 5½ inches for whitefish.
- 1 possession of whitefish in close season.

#### FISHWAY AND DAMS

These have been carefully inspected from time to time and with the exception of the Eau Clair dam at Calgary they have been reported as being in good condition. A fishway was ordered to be built on the Pembina, where lumbering operations prevented fish passing to their breeding grounds, and this is being attended to this spring.

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## ANGLING

Owing to the great amount of rain in the southern part of Alberta, angling was not as successful as in years past, although the statistics show that a greater amount of fish was taken, this has been made possible through a closer check on the anglers and their catches. Through the roads being impassable for most of the season the headwaters of the streams have had a rest from the heavy fishing of the past dry years, and this will I think prove of the greatest benefit in the conservation of fish. Overseer Holmes has reported some improvement through the restocking of the lakes and streams in his district by the Banff hatchery.

In conclusion I might state that there are many inquiries regarding the contemplated operations at lake Athabasca during the coming season, and I am confident that in the very near future it will be possible to report the starting of fishing in this lake again. Several new lakes were explored, and one new lake fished commercially—Island lake—near Buffalo lake. This lake, however, is so covered with islands that the fish were not discovered this season in paying quantities. Next year will see one of the companies operating at several new lakes in the vicinity of Buffalo lake, which are said to contain trout weighing in the neighbourhood of 50 and 60 pounds, and also containing unlimited quantities of whitefish.

Inquiries have also been received from a firm in the East as to possibility of establishing a fish oil plant in Alberta, and one for the production of fish essence. At the present time an endeavour is being made to place smoked Alberta whitefish on the menu of the Canadian National Railway which may result in success along this line. Further, one of the companies operating in this province is experimenting along the lines of producing fish cakes canned and manufactured out of the coarser varieties.

## REPORT OF CHIEF INSPECTOR MAJOR J. A. MOTHERWELL, WESTERN FISHERIES DIVISION (BRITISH COLUMBIA) FOR 1923

## SALMON

By reference to statement No. 1, which gives the pack of canned salmon in British Columbia from the year such operations started in the province, it will be observed that the pack for 1923 amounted to the satisfactory total of 1,341,677 cases, the fifth largest since 1876. Previous to 1902 the pack of varieties other than sockeye was negligible and the increase of the past thirteen years particularly has been accounted for by the quantity of the fall varieties canned.

In the Fraser river district the pack of sockeye amounted to 29,423 cases which is practically the same as that of the brood year of 1919. The total of all varieties amounted to 224,637 cases but the comparison of this total with that of previous years would not be enlightening owing to the fact that during 1923 a very considerable portion of the pack of chums particularly was obtained from the Vancouver island district and cannot be properly included with the pack taken from the runs to the Fraser river.

The pack of sockeye on Puget Sound and practically all of which is taken from the run proceeding to the Fraser river, amounted to 47,402 cases as against 64,346 cases in the brood year of 1919. The catch of pinks in the Fraser river district and the Puget Sound Area, and which is practically all taken from the runs proceeding to the Fraser and streams in the immediate vicinity, accounted for 539,494 cases compared with 412,891 cases in the brood year of 1921.

In connection with the run of pinks it is observed that the Americans in Puget sound this year took 475,849 cases compared with 63,645 packed by the Canadian operators in the Fraser River district, although the great percentage of the run is proceeding to the spawning areas on the Canadian side of the line. During the season the run while passing through American waters ran the gauntlet of numerous traps and purse-seines which captured such large quantities that in certain instances it was impossible to market the catch and it was lost.

Seines are not permitted on the Canadian side in the Fraser river area and the fishermen depend on gill-net operations entirely. For some reason or other what was left of the large run of pinks after passing through Puget sound waters remained outside of the Fraser river until close to spawning time and the biggest run in the river occurred during the weekly closed period and a very satisfactory proportion reached the spawning grounds. It would seem that even to a greater extent than in the case of the sockeye, the pinks are protected on the Canadian side largely for the benefit of American competitors.

The run of springs to the Fraser river was the poorest in many years. The run of cohoes was fair, but the supply of chums was extremely satisfactory.

In the Rivers and Smiths inlet districts, which have been combined in the statement of pack for purposes of more accuracy, it will be found that the pack of sockeye amounted to the very satisfactory total of 118,502 cases, the largest since 1920. It will be remembered that in 1919 the drag-seine at Quashella creek, Smiths inlet, after fishing a very short period, was taken out and no seines have been permitted in Smiths inlet area since. This has undoubtedly been a factor in the good pack of 1923. In addition to the satisfactory quantities caught an inspection of the spawning areas shows that a plentiful supply of parent salmon reached the spawning areas.

The average earnings of the gill-net fishermen during the few weeks of operations in this area amounted to approximately \$470 each, the high boat in Smiths inlet produced a net earning of \$1,633 for four weeks' fishing. This was operated by an independent white man. Weather conditions enter very largely into the gill-net fishing operations. In the rainy dark weather the salmon swim deep and a large portion pass under the nets, whereas on a bright sunny day they are to be found nearer the surface and become an easier prey to the nets. During the season 1923 the weather conditions were most favourable although owing to the unusually light fall of rain many of the small streams along the coast, until very late in the season, did not contain enough water to permit the salmon to ascend to the spawning grounds. This was particularly the case in districts fished by purse-seines and drag-seines and unusual precautions were necessary with a view to protecting the salmon waiting at the mouths of these stream.

In the Skeena river district the pack of sockeye amounted to 131,731 cases, the product of the runs of 1918 and 1919, the Skeena river sockeye being four and five years old fish. In view of the fact that the weekly closed season was 48 hours and that there was a net decrease of 191 in the number of gill-net boats fished on the river, the pack would appear to be a satisfactory one. The results of the extended closed period and the reduction in fishing equipment is reflected in a most gratifying way in the splendid quantities of parent fish on the spawning grounds. It will be observed from statement No. 5, that only in one year since 1911 has the 1923 pack of sockeye on the Skeena river been exceeded and only twice since 1877. The runs of the other varieties were satisfactory but the packs apart from the sockeye cannot be taken as representing the size of the run for the reason that while an effort is always made

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to capture as many sockeye as possible, the quantities of the other varieties taken depend entirely on the fluctuating markets.

In the Queen Charlotte islands there is a large run of pinks in the even numbered years and 1923 being an off year at that district the result is reflected in the total pack.

On the Naas river the comparatively good run of the previous season was not maintained, the quantity of sockeye packed amounting to only 17,821 cases compared with 28,259 cases in 1919 and 21,816 cases in 1918. The run of pinks was not so good as in the preceding year or in the brood year of 1921.

The quantity of salmon packed in the province during the past few years and the conditions of the spawning beds would appear to justify the statement that in British Columbia apart from the Fraser and Naas rivers, both of which are contiguous to American waters, there is no fear of depletion of the salmon runs and particularly in view of the existing fishery regulations and the efficacy of the patrol service coupled with the very satisfactory operations of the salmon hatcheries.

## HALIBUT

With a total of 334,667 cwts. the landings of halibut at British Columbia ports has established a record during 1923. By reference to statement No. 9 it will be observed that of the total landings 203,666 cwts. were brought in by boats of American registry. A very large percentage of the total landings of the province passed through the port of Prince Rupert and over the Canadian Government Railway system to markets in Eastern Canada and the United States.

In anticipation that the proposed closed season for halibut fishing on the coast would come into effect during the year probably a greater effort than usual was made to fill the cold storage establishments but in spite of the fact that the new regulations did not come into force the market was sufficiently attractive to permit of the large stocks of frozen fish being disposed of.

In connection with the large catch by American boats as compared with that of Canadian vessels, it is interesting to note that during the unfavourable weather when it is impossible for the smaller Canadian boats to fish the most attractive banks off the coast of Alaska, the small American craft are able to continue operations inside the territorial waters of Alaska which results in their delivering a larger catch than the Canadian fishermen. Out of a total of 315 boats delivering halibut at Prince Rupert 210 were under American registry.

In addition to the catch being so large the prices obtained at Prince Rupert reached the highest point since the war. In October, 1923, the price of 23.1 cents per pound was paid for first grade for catches by American boats whereas during the war the highest point reached was 23 cents.

Unfortunately the treaty providing for a closed season for halibut fishing did not pass the American Senate as was expected and cannot come into force until the fall of 1924. Indications, however, would appear to justify the expectation that there will be no further delay.

## HERRING

There was a good average run of herring during the year and this particularly applies to the west coast of Vancouver island where the largest operations have been conducted in recent years.

A very large proportion of the catch is dry salted and shipped to the Oriental market. During the year the prices obtained have been unusually attractive, at one time during the season reaching \$82 per ton C.I.F. China. It is interesting to note that the dry salting business is coming more and more into

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the hands of the whites. Until fairly recently the Japanese have controlled the industry, the market being China. During the year the Canadian white brokers have handled a very large percentage of the product.

The value of herring products at the point of shipment is approximately as follows:—

One ton of raw herring equals	400 lbs. stock food worth.....	\$ 12 00
do	400 lbs. fertilizer worth.....	10 00
do	30 Standard gals oil worth.....	10 50
do	1,000 lbs. Dry Salted worth.....	20 00
do	1,000 lbs. Kipperd worth.....	90 00
do	30 Cases Canned worth.....	195 00
do	6 bbls. Scotch cured worth.....	75 00
do	Halibut Bait worth.....	30 00

## PILCHARDS

At certain seasons of the year on the west coast of Vancouver island pilchards appear in great numbers. During recent years considerable quantities have been canned but recently the market conditions have not been sufficiently attractive to permit of large quantities being put up. A contributory cause is the low price for which such excellent food as canned chum salmon can now be obtained.

## WHALING

The whaling stations at Kyuquot, Rose Harbour, and Naden Harbour were operated during the year, the catch showing a considerable increase over the previous season. The number and species of whales taken is as follows:—

Species	Kyuquot	Rose Harbour	Naden Harbour	Total
Sperm.....	32	38	24	94
Sulphur.....	5	26	31	62
Fin.....	54	75	37	166
Hump.....	32	21	25	78
Sei.....	13	37	3	53
BN.....	2	—	—	2
Total.....	138	197	120	455

## FUR SEALS

The Indians off the west coast of Vancouver island were particularly successful in fur sealing operations although a considerable number are taken in the vicinity of Hecate straits. A total of 2,979 were cleared through the Customs ports of the province.

## DESTRUCTION OF SEA LIONS

As a result of the recommendation made by the Fisheries Commission of 1922 and also following suggestions contained in the report following the sea lion investigation of 1916, further efforts were made during the year looking to the reduction of these mammals found to be so numerous in the close vicinity of some of the principal salmon areas. The C.G.S. *Givenchy* left on the 18th of May for the Pearl and Virgin rocks in Queen Charlotte sound opposite Rivers inlet and Smiths inlet. Operations at these points are extremely difficult owing to the waters in the vicinity being uncharted and the whole area exposed to the sweep of the Pacific. This necessitated absolutely calm weather before approaching the rocks. The total number destroyed amounted to 1,885 including 1,231

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adults and 654 pups. In this work a Lewis gun, several .44 calibre rifles and clubs were used. Undoubtedly the slaughter of so many sea lions just before the valuable sockeye salmon were due to arrive greatly assisted the operations of the gill-net fishermen and numerous gill-netters expressed their delight and stated that their fishing operations were freer of interference from sea lions than they had been for a great many years and attributed these conditions to the sea lion hunt by the department.

## PATROL SERVICE

The patrol fleet for the year consisted of the steam trawlers *Malespina* and *Givenchy*, the oil burning steamer *Marfish*, and nineteen gas boats all the property of the department, and in addition fifty chartered gasoline boats and one seaplane. The *Malaspina* logged 13,542 miles and the *Givenchy* 14,404 miles during the season. Fourteen of the gas boats owned by the department logged 93,010 miles, or an average of 6,643 miles each. Four of these gas boats remained on duty the full 12 months. The remainder, together with all the chartered boats were in commission for periods from one month to seven months. For the first three months of the year the C.G.S. *Thiepval*, the property of the Department of National Defence, was also loaned to the Fisheries Department to assist in the patrol of the three mile limit. The *Givenchy* was, during the last two weeks in the year, engaged in life-saving duties on the west coast of Vancouver island with headquarters at Bamfield.

A seaplane with headquarters at Prince Rupert consumed sixty-nine flying hours in fisheries protection work and the results obtained were sufficiently encouraging to justify the expectation that the number of patrol boats can be reduced with certainly no decreased efficiency, but rather with the expectation of more efficient service. There are certain difficulties in connection with seaplane patrol which it is difficult to overcome. In discovering a violation at a considerable distance from a patrol boat or settlement very little can be done beyond taking the name and number of the operator and boat and report to the nearest patrol boat or fishery officer. In the less isolated areas, however, it is usually possible to obtain a patrol boat within a reasonable time to take charge of the offender and his boat. At night and during a fog the plane is of no use but on the other hand in the isolated districts the seining operations which require so much attention can be adequately looked after by the means of the plane. The moral effect on the fishermen is excellent as they never know at what time a patrolman may come upon them from the air.

In addition to assisting with the patrol service next season it is proposed to obtain aerial photographs of the more important spawning areas in District No. 2. An examination by the ordinary means results in the expenditure of considerable money, effort, and time, and in some cases after the difficult task of getting into the upper waters the area has been found of little use. By means of the aerial photographs it will be possible to decide whether it is necessary to send in officers for a more detailed examination. By means of the photographs any serious obstructions in streams would probably be discovered.

At the present time two new 60-foot patrol boats are being built for the department at the Government Dockyard at Prince Rupert. These are being powered with 60 horse-power Beardmore semi-Diesel engines. Undoubtedly the crude oil engine is far more economical and just as efficient as the gas engine. The new boats are expected to be ready early in the spring of 1924. One is to replace the expensive *Fispa* for use of the Inspector of District No. 3 and the other will be used in District No. 2. The *Fispa* has been disposed of to the Vancouver Harbour Board.

## REGULATIONS

During the year there were eighty-five prosecutions and seventy-six convictions for violations of the Regulations. The fines and sales from seized fishing equipment amounted to \$3,174.95.

The observance of the Fishery Regulations showed a considerable improvement over previous seasons and this applies particularly to the northern districts where, by a careful reorganization of the patrol service, excellent results have been obtained.

The weekly closed period of forty-eight hours for salmon fishing and which extended from 6 a.m. Saturday of each week to 6 a.m. Monday, was, at the request of the fishermen and other operators in District No. 2, altered for that district to cover the period from Friday at 6 p.m. to Sunday at 6 p.m. This has the effect of permitting all the canning establishments with their large staffs to rest on Sundays and permit the fishermen to obtain the Sunday night's fishing.

## REDUCTION IN ORIENTALS

The gradual elimination of the Oriental from the fisheries of the province is primarily for the purpose of providing greater encouragement to White men and Canadian Indians to take up fishing for a living. By reference to the very interesting statement No. 8 the results in connection with the salmon gill-net operations in the several areas will be observed. Extending over the whole province the increase in the number of whites was 9.5 per cent and in the case of Indians 7.4 per cent and in the case of Orientals a decrease of 40 per cent which was recommended by the 1922 Fisheries Commission. The total number of fishermen of all nationalities decreased 534 or 11.9 per cent. On the Fraser river there was an increase of 6.2 per cent in whites but a decrease of 20.6 per cent in the case of Indians. On the Skeena river the increase in whites was 11.9 per cent and 16.2 in Indians.

In the case of salmon trolling while the reduction in Oriental licenses was 25 per cent the increase in Indians was 13.9 per cent but there was a decrease in whites of 6.1 per cent. Out of 1,446 trolling licenses issued for the province 1,154 were issued for District No. 3, 579 for the east coast and 575 for the west coast of Vancouver island.

It is interesting to note that on the east coast the increase in whites amounted to 69.7 per cent and in the case of Indians 343.4 per cent but on the West Coast where operations are considerably more difficult and hazardous there was a decrease of 22.6 per cent in the case of whites and 14.1 per cent in the case of Indians in spite of the reduction of 25 per cent in Orientals.

Cod fishing by means of lines was not licensed prior to 1923 but for the purpose of including this method of fishing in the general reduction in the case of Orientals licenses were required of all nationalities. It is the intention during 1924 to include cod handline licenses in the general policy of a 40 per cent reduction in the case of Orientals.

Owing to the desirability of eliminating or greatly reducing the quantities of grayfish and the necessity for every encouragement to this end and which policy was recommended by the Fisheries Commission of 1922, there is no limitation to the number of grayfish licenses which may be issued to Orientals or other nationalities providing they are British subjects.

The policy of the elimination of the Oriental in salmon seining operations naturally resulted in the development of this class of fishing by whites. The experience has been that white seine crews can be just as efficient if not more so than the Oriental and this applies very largely to the Indian as well.

## ANGLING

It is becoming increasingly difficult to fill the requirements of the numerous applications for the stocking of the various lakes and streams with the several sporting varieties of fish. During the year ninety-nine applications were filled by means of Kamloops, Steelhead, Cutthroat, and Eastern Brook trout and Atlantic salmon. A total of 3,241,896 eyed eggs and fry were utilized for this purpose and results have been extremely satisfactory. Many lakes which in the past have never had many fish and others which have become depleted owing to excess of fishing have been stocked much to the satisfaction of a great many angling associations and individuals and much excellent angling will be provided within reasonable distance of the larger centres of population.

## SCIENTIFIC INVESTIGATION

It is most gratifying to find that arrangements have been made by which the Fisheries of British Columbia are to receive more attention from the Biological Board with a view to investigating and advising on the numerous problems confronting the industry. The province of British Columbia has long felt the need of such action and although results cannot be expected to become apparent immediately, yet scientific investigation can be depended upon to in the near future show results making for a more intelligent understanding of fisheries problems by both those interested commercially as well as the staff of the Fisheries Department. It is hoped that conditions are being made sufficiently attractive to ensure the retaining permanently of desirable officers and instead of investigations being conducted intermittently there may be a continuity of observations by the same officers which will result in conclusions and solutions of great value to the industry.

## BRITISH COLUMBIA FISHERIES COMMISSION, 1922

As a result of the recommendations made by the Commission of 1922 which investigated fisheries affairs in British Columbia, the following alterations were made in regulations and policy:—

- (1) After the year 1923 gas boats will be permitted to be used anywhere in the province in salmon gill-net operations. These had previously been prohibited in District No. 2 and sail boats were provided by the canning companies.
- (2) The number of fishing licenses issued to other than resident white British subjects and Canadian Indians was reduced by 40 per cent apart from salmon trolling licenses where the reduction was 25 per cent.
- (3) The license fees and taxes were very materially reduced resulting in considerable satisfaction to the fishermen and operators generally but naturally reducing considerably the amount of revenue collected.
- (4) The fishing boundary limits at the mouths of streams were altered to 400 yards from the mouths of streams. The power was left with the chief inspector for the province to move these further out if considered necessary.
- (5) A reserve was arranged in the Cowichan bay area in order that the Fisheries at that point might be allowed to recover and that the several varieties of fish coming to the Cowichan river might receive protection.
- (6) The regulation permitting of salmon fishing to commence on May 1 on certain portions of Vancouver island was altered to conform with the balance of the district.

(7) The weekly closed period for salmon fishing was made a uniform one of forty-eight hours.

(8) Departure bay was closed to all herring fishing by means of seines.

#### INDIANS

Previous to the year 1923 seining licenses have never been issued to Indians although these wards of the Government have been employed largely in the operations conducted with such fishing gear. The Indians have always felt that this was an unfair discrimination against them and the department decided during the year to grant them the same privileges in the way of seining licenses as are enjoyed by the whites. This privilege has been the cause of considerably increased good feeling on the part of the Indians.

Through the co-operation of the several officers of their department, deserving and needy Indians are being provided each year with fishing permits, which will permit them to take, without cost, a sufficient quantity of salmon to meet their requirements in the way of food during the winter season. Salmon so taken are not permitted to be sold.

#### INSPECTION OF SPAWNING AREAS

Just as far as it is practicable all salmon spawning areas were inspected while the parent fish were on the spawning beds. In this connection it is pointed out that owing to the fact that it is impossible under present conditions to employ the same men year after year for this work the reports received cannot be of as great comparative value as would be the case if the same officer year after year reported on the one area. In some of the most important districts, however, it has been possible to make satisfactory arrangements and the increased value of such information is obvious.

*Naas River District.*—The inspection of the Naas river area was undertaken about one week earlier than usual and the information obtained would appear to show that the supply of sockeye salmon on the spawning grounds was considerably less than in the fall of 1922 and with very little improvement over that of 1921. It will be remembered that there was a fair run of this variety to the Naas river in 1922 when the pack reached 31,277 cases against 17,821 in the year under review and 9,364 in 1921. A few sockeye were seen at the upper fall and there was a better showing at the lower fall and more were observed coming in as the inspecting officers were leaving.

The run of spring salmon was the best experienced since 1910.

The repairs to the fishway were made during July and at that time the engineer in charge of the work reports that as soon as the water was turned into the structure after the repairs were completed the salmon which were gathered at the base passed through with ease and the run appeared to be a fairly heavy one for a few days.

The report on the Bowser lake section of this watershed was again discouraging and although a small quantity of sockeye salmon was observed conditions would appear not to be suitable for any large run.

*Skeena River Watershed.*—The reports received demonstrate that again this watershed has been abundantly seeded with sockeye salmon. At Babine lake, which is the principal spawning area for the district, conditions were found to be most gratifying, the spawning beds in practically all the streams being heavily seeded. This condition also applies to Babine river and very satisfactory supplies of the spring and pink varieties were also found. It is only every other year that there is such a large run of pinks to the Skeena.

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It will be remembered that previous to the hatchery operations on the creek draining Morrison lake the supplies of eggs for hatching artificially had to be obtained from the different streams around the lake, but owing to fish cultural operations it is now unnecessary to go further than practically the hatchery door for obtaining more than the sufficient quantity of eggs to fill the hatching troughs to capacity. This is a good illustration of what can be done by the fish cultural methods being carried on by the department.

In the Lakelse lake area there was also a splendid supply of sockeye and pink salmon. A good run of sockeye has also been reported from the Kitsumkalem area.

Several cannery managers on the Skeena during the summer remarked on the good run of sockeye up the Oxtahl river and which they stated was undoubtedly due largely to the work of clearing the obstructions to the ascent of salmon and which work was done four years previous permitting the parent fish to reach the spawning grounds.

The run of spring salmon to the Skeena was the best experienced since 1910.

*Central Division.*—The streams on the mainland of this area which are fed by glaciers had a plentiful supply of water throughout the summer and the salmon were able to ascend to the spawning grounds but on the islands conditions are very different and frequent rain is necessary to keep the streams full. Unfortunately last summer was an unusually dry one and it was necessary to give this area increased attention in the way of patrol service in order to protect the parent fish until the rains arrived later in the fall when they were able readily to pass up.

*Bella Coola and Kimsquit.*—The spawning areas in this vicinity were fairly well seeded.

*Rivers Inlet.*—Conditions at this point were found to be most satisfactory. The provincial officer, our own overseer and the superintendent of the hatchery, all agree that the spawning beds were abundantly seeded with sockeye and that the run to the Inlet was one of the best in recent years.

Undoubtedly the very considerable amount of work done in 1919 in the way of clearing obstructions to the ascent of salmon in the several tributaries of Owekano lake contributed very largely to the good supply of salmon in 1923.

*Smiths Inlet.*—Conditions in this area were found to be similar to those in the Rivers Inlet district. The fishery overseer states that the showing of sockeye was the best seen by him since 1918. It will be remembered that in 1919 in the middle of the fishing season the seining operations at Quashella creek were stopped and this no doubt has a bearing on present conditions.

*Queen Charlotte Islands.*—It is only in the even numbered years that the large run of pinks occurs in this district. The quality of these pinks is equal to any pink salmon taken on the Pacific coast. Although the off year for the above mentioned variety the spawning grounds were well seeded with chums and the conditions in the several streams were such as to permit of a reasonably easy ascent to the spawning grounds.

*Alert Bay District.*—The principal stream in this area is the Nimpkish river. During the season there were no fewer than ten drag-seines operating at this point for sockeye. Fishing was not permitted, however, until the 20th of June, although in previous years operations commenced during the last few days in May. The result was that an abundant supply of parent fish were able to reach the spawning areas.

Cohoes and chums were plentiful everywhere but owing to this being the off year for pinks the supply of that variety was light.

*Quathiaski District.*—The run of sockeye to Heydon bay and Port Neville was good, although that to Philips arm was not up to expectations. There was an excellent run of the coho variety although pinks and chums were not so numerous.

*Pender Harbour District.*—No cannery operations were conducted in this district during the season. The Sauch-en-Auch creek area which has been receiving considerable attention during the past few years from the Department was again plentifully supplied with spawning sockeye. The runs of coho and chums were very satisfactory and in certain portions of the district this applies to pinks as well.

The streams on the east coast of Vancouver island generally were well seeded with chums particularly.

At the Cowichan river, which is one of the principal angling streams on the coast, the fishery officers report excellent catches of rainbow and cutthroat trout. The prohibition of the use of salmon eggs or compound in angling will undoubtedly greatly assist conservation of the sport fish.

*West Coast of Vancouver island.*—The only sockeye districts on the west coast of any considerable importance are at Kennedy river in Clayoquot sound, and Anderson, Sproat and Stamp rivers in Barclay sound. The supply at Kennedy lake, although the pack at the cannery at the mouth of the river was 4,482 cases of sockeye as against 5,393 in 1922, proved to be rather disappointing. The collection of eggs at the hatchery amounted to only 5,306,000.

At Anderson river the conditions were much more satisfactory and the hatchery situated on the lake was filled to capacity and by far the largest percentage of parent fish were permitted to deposit their eggs naturally. The runs to the Sproat and Stamp rivers were light.

The supply of chum salmon on the west coast was excellent and this applies particularly to the Barclay sound district, the spawning streams being splendidly seeded.

*Fraser River Watershed.*—In the districts above Hells gate the reports received show that the runs of salmon were extremely disappointing. The Quesnel lake, Bowron lake and Chilco lake districts provide no encouragement.

In the Shuswap area, however, the local officer reports an improvement over the year previous and particular reference is made to the South Thompson, Little river, Adams river and Barriere river.

At Harrison lake there was an unusually large run of sockeye and 11,162,000 eggs of this variety were taken at the outlet of the rearing ponds and evidently were fish returning as a result of a distribution of fry from these ponds four years previous. The collection at Morris creek was also a very satisfactory one. It is noted that the supply of the sockeye variety taken during this year's spawning operations was the largest since 1915.

In the Birkenhead river there was, as usual, an excellent supply of parent fish. The hatchery was easily filled to capacity and large quantities of spawning fish were permitted to deposit their eggs naturally.

There was a good run of the several varieties apart from the sockeye. The supply of pink salmon this year requires special mention. In spite of prophesies to the effect that overfishing had largely depleted the pink run, the numbers arriving this year exceeded all expectations and the spawning grounds in the lower Fraser, Howe sound, and Burrard inlet were very heavily seeded. It is only in the odd numbered years that the large run of pinks occurs to the Fraser.

#### GENERAL

Owing to the reduction of 40 per cent in the number of salmon gill-net licenses issued to others than resident white British subjects and Canadian

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Indians during the year, there was a smaller amount of fishing equipment in operation in most of the salmon gill-net areas and this fact undoubtedly contributed to the splendid conditions found on most of the spawning beds at the head of the gill-net areas.

## DEPARTMENTAL OFFICERS

The industry was fortunate during the year in having the opportunity to discuss locally the numerous fishery problems with the minister, the deputy minister, and the assistant deputy minister, who visited the coast.

## STAFF

As a result of the development of the fisheries of the province and the requirements of the several departments, the staff is kept exceedingly busy and in spite of much overtime it is becoming more and more difficult to keep up with the work. It is a great pleasure to testify as to the loyalty of the staff in the province in spite of the volume of work which is required of the members.



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1905.....	67	"	"	"	1,080,673	(28,359)	Red & Wh. Springs)				44,458	13,970	1,167,460
1906.....	64	"	"	"	459,679	31,261	1,083				69,132	(88,308 Pks. & Ch.)	629,460
1907.....	58	"	"	"	314,074	23,159	2,939				87,900	(118,704 "	547,459
1908.....	52	"	"	"	355,023	25,433	2,731				81,917	(76,448 "	542,689
1909.....	72	"	"	"	840,441	18,218		799			61,918	(46,544 "	967,920
1910.....	58	"	"	"	565,915	19,313		9,476			74,382	58,362	762,201
1911.....	59	"	"	"	383,509	38,751		9,705			119,802	305,247	948,965
1912.....	57	3,040			444,762	62,345		18,092			165,309	247,743	996,576
1913.....	78	4,782			972,178	37,433		3,616			69,822	192,887	1,353,901
1914.....	63	4,857			536,696	32,908		16,420			120,201	220,340	1,111,039
1915.....	63	4,951			476,042	51,734		6,370			146,956	367,352	1,133,381
1916.....	72	4,800			214,789	51,231		15,495		3,096	183,623	280,644	995,065
1917.....	94	5,286	1,370	90	339,848	48,630		27,646		(11,740 BB. & SH.)	157,589	496,759	1,557,485
1918.....	88	5,073	1,786	122	276,459	65,535		41,819 Pk. & Wh.)		(15,916 BB. & SH.)	191,068	527,745	1,616,157
1919.....	82	4,598	2,260	139	369,445	73,179		9,077		4,493	175,670	346,639	1,393,156
1920.....	65	4,761	1,855	155	351,405	95,983		8,441		2,395	101,972	520,856	1,157,616
1921.....	56	4,777	1,452	59	163,914	36,725		6,061		1,220	117,288	192,906	603,548
1922.....	64	4,491	1,513	143	299,614	21,163		11,913		1,657	102,845	581,979	1,290,326
1923.....	61	3,957	1,446	223	334,647	17,539		4,858		1,760	112,044	440,932	1,341,677

NOTE.—Licenses issued 1923 include transfers from one district to another.

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## PACK OF CANNED SALMON IN THE FRASER RIVER DISTRICT—1876 TO 1923

STATEMENT No. 2.

Year	Num- ber of can- ner- ies oper- ated	Number of salmon licenses issued					Sockeye	Red Spring	Pink Spring	White Spring	Blue- backs	Steel- heads	Cohoos	Pinks	Chums	Totals	
		G.N.	Troll.	P.S.	D.S.	T.N.											
1876	3	Particulars not available.					Particulars of varieties not available—practically all sockeye.										9,847
1877	5	"	"	"	"	"	"	"	"	"	"	"	"	"	"	64,387	
1878	8	"	"	"	"	"	"	"	"	"	"	"	"	"	"	105,101	
1879	7	"	"	"	"	"	"	"	"	"	"	"	"	"	"	50,490	
1880	7	"	"	"	"	"	"	"	"	"	"	"	"	"	"	42,155	
1881	8	"	"	"	"	"	"	"	"	"	"	"	"	"	"	142,516	
1882	11	"	"	"	"	"	"	"	"	"	"	"	"	"	"	199,104	
1883	13	"	"	"	"	"	"	"	"	"	"	"	"	"	"	109,701	
1884	6	"	"	"	"	"	"	"	"	"	"	"	"	"	"	38,437	
1885	6	"	"	"	"	"	"	"	"	"	"	"	"	"	"	89,617	
1886	11	"	"	"	"	"	"	"	"	"	"	"	"	"	"	99,177	
1887	12	"	"	"	"	"	"	"	"	"	"	"	"	"	"	130,088	
1888	12	"	"	"	"	"	"	"	"	"	"	"	"	"	"	76,616	
1889	16	"	"	"	"	"	"	"	"	"	"	"	"	"	"	303,875	
1890	16	"	"	"	"	"	"	"	"	"	"	"	"	"	"	241,889	
1891	11	"	"	"	"	"	"	"	"	"	"	"	"	"	"	178,954	
1892	11	"	"	"	"	"	"	"	"	"	"	"	"	"	"	79,715	
1893	21	"	"	"	"	"	"	"	"	"	"	"	"	"	"	457,797	
1894	20	"	"	"	"	"	"	"	"	"	"	"	"	"	"	363,967	
1895	21	"	"	"	"	"	"	"	"	"	"	"	"	"	"	400,368	
1896	29	"	"	"	"	"	"	"	"	"	"	"	"	"	"	356,984	
1897	35	"	"	"	"	"	"	"	"	"	"	"	"	"	"	860,459	
1898	35	"	"	"	"	"	"	"	"	"	"	"	"	"	"	256,101	
1899	41	"	"	"	"	"	"	"	"	"	"	"	"	"	"	510,383	
1900	48	"	"	"	"	"	"	"	"	"	"	"	"	"	"	316,522	
1901	49	3,832	Particulars not available				"	"	"	"	"	"	"	"	"	990,313	
1902	42	2,685	"				293,477	Other Varieties: 33,618								327,095	
1903	35	3,101	"				204,809	(2,084: Red and White Spring)								237,125	
1904	23	2,224	"				72,688	(9,482: Red and White Spring)								128,903	

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1905.....	38	2,770	.....	837,489 (5,507: Red and White Spring)	.....	.....	.....	30,836	3,304	.....	877,136
1906.....	24	1,746	.....	183,007	6,503	.....	.....	34,413	(15,543 Pk.&Ch.)	.....	240,486
1907.....	18	1,726	.....	59,815	3,448	.....	1,020	35,766	(63,530 Pk.&Ch.)	.....	163,116
1908.....	16	1,374	.....	63,126	1,427	.....	557	24,198	(415 Pk.&Ch.)	.....	89,184
1909.....	38	2,688	.....	542,248	1,428	.....	18	21,540	(1,987 Pk.&Ch.)	.....	567,203
1910.....	21	1,577	.....	133,045	1,018	.....	8,925	27,855	128	52,177	223,148
1911.....	15	1,396	.....	58,487	7,098	.....	6,751	39,740	142,101	47,237	301,344
1912.....	15	1,430	.....	108,784	14,655	.....	8,373	38,574	574	12,961	173,921
1913.....	35	2,560	.....	684,596	3,573	.....	49	11,648	9,973	22,220	732,059
1914.....	20	2,656	.....	185,483	9,485	.....	14,000	38,639	6,057	74,726	328,390
1915.....	22	2,616	.....	89,040	15,388	.....	3,532	34,114	128,555	18,539	289,119
1916.....	21	2,240	.....	27,394	11,096	.....	9,217	24,580	840	30,184	106,440
1917.....	29	2,626	.....	123,614	10,197	.....	18,916	25,895	134,442	59,973	377,988
1918.....	18	1,582	.....	16,849	15,192	.....	24,274	40,111	18,388	86,215	206,003
1919.....	14	1,337	.....	29,628	14,519	.....	3,592	39,253	39,363	15,718	158,718
1920.....	11	1,288	.....	44,598	19,961	.....	2,204	22,934	12,839	23,884	132,800
1921.....	13	1,437	.....	35,900	11,360	.....	5,480	29,978	8,178	11,223	103,917
1922.....	10	1,296	.....	48,744	10,561	.....	3,867	23,587	29,578	17,895	137,482
1923.....	11	964	.....	29,423	3,854	.....	3,615	20,173	63,645	103,248	224,637

NOTE.—Licenses issued 1923 include transfers from other districts.



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1905	6	"	"	"	90, 713 (351 Red & Wh. Spr.)				66 (700 Pk. & Ch.)		91, 064
1906	8	"	"	"	132, 631	181			6, 240		132, 878
1907	8	"	"	"	97, 874	750			9, 505 (4, 679 Pk. & Ch.)		105, 564
1908	8	"	"	"	74, 452	1, 254			1, 400 (300 Pk. & Ch.)		89, 890
1909	8	"	"	"	102, 527	1, 087			2, 075	19	105, 314
1910	8	"	"	"	141, 921	383			8, 287	6, 411	144, 398
1911	8	"	"	"	105, 763	1, 317			11, 095	11, 723	127, 066
1912	8	"	"	"	129, 217	1, 452		408			158, 798
1913	8	"	"	"	79, 345	1, 589			3, 708	4, 287	90, 944
1914	8	"	"	"	89, 890	566			7, 789	5, 784	109, 052
1915	8	"	"	"	162, 651	1, 022			7, 115	5, 387	292, 179, 431
1916	9	"	"	"	58, 192	1, 033		389	15, 314	3, 567	13, 990 112, 629
1917	10	"	"	"	75, 326	715		102	9, 124	8, 065	16, 101
1918	10	"	"	"	68, 447	957		367	12, 074	28, 542	4, 325 113, 758
1919	11	"	"	"	66, 842	957		85	12, 074	29, 542	10, 736 128, 937
1919	11	"	"	"	73, 754	967		234	9, 038	6, 538	10, 736 127, 532
1919	11	"	"	"	72, 072	967		241	9, 038	6, 538	13, 053 110, 736
1920	10	"	"	"	142, 793	1, 537		100	2, 922	26, 189	13, 053 109, 234
1920	10	"	"	"	153, 245	1, 537		81	2, 922	26, 189	174, 938
1921	10	"	"	"	50, 849	386		44	4, 055	3, 055	166, 390
1921	10	"	"	"	49, 729	406		44	4, 784	5, 356	58, 562
1922	10	"	"	"	68, 818	216		38	1, 145	24, 311	60, 569
1922	10	"	"	"	56, 518	216		82	1, 145	24, 311	94, 900
1923	10	"	"	"	118, 502	230		113	1, 526	10, 057	92, 690
1923	10	"	"	"	112, 550	250		113	1, 526	10, 057	133, 930
1923	10	"	"	"					1, 526	10, 057	177, 778

NOTE: Figures shown in black are packs from fish caught at Rivers Inlet or Smiths Inlet. Figures in black for years previous to 1918 are actual packs. Figures shown in italic, 1918 to 1923, are actual packs irrespective of where fish taken and not including fish shipped out for canning in other districts.

\*1914 figures include Rivers Inlet pack only, no figures being available for Smiths Inlet for that year.

NOTE.—Re column "Varieties other than sockeye packed at Smiths Inlet." For the years this column is utilized, figures of the different varieties other than sockeye packed at Smiths Inlet were not available, and had to be shown as a total. Sockeye for these years are shown under their proper heading.

†Statement No. 3 on page 63.



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	1909	12	"	87,901	11,727		742		12,249	(28,120	Pk.&Ch.)	140,739
	1910	12	"	187,246	9,546		239		11,531	13,473		222,035
	1911	12	850	131,066	15,514		2,428		23,376	81,956	70	254,410
	1912	12	"	92,498	19,332		4,501		38,835	97,588	504	254,258
	1913	13	"	52,927	23,250		3,186		18,647	66,045		164,055
	1914	13	"	130,166	11,529		211		16,378	71,021	8,329	237,634
	1915	13	"	116,553	15,069		204		32,190	107,578	5,769	279,161
	1916	14	"	60,923	18,372		2,561		47,409	73,029	17,121	223,158
	1917	15	788*	65,760	13,586		2,699		38,456	148,319	21,516	292,219
	1918	15	889*	128,322	16,013		6,828		38,759	161,727	22,573	374,216
	1919	14	"	184,945	19,661		2,656		36,559	117,303	31,457	398,877
	1920	15	954	90,869	37,403		3,123		18,068	177,679	3,834	334,392
	1921	13	1,109	40,018	18,599		445		45,033	124,457	1,983	234,765
	1922	13	"	100,615	7,080		1,805		24,673	203,555	17,068	362,055
	1923	13	"	131,731	8,803		1,499		31,967	145,973	16,527	338,863

\* Approximately.

NOTE.—Salmon gill-net figures 1923 include 1 transfer.



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1909	3	240	"	23,246	2,280	57	6,813	(3,539 Pk. and Ch.)	40,990
1910	4	240	Particulars not available.	30,810	1,228	11	6,285	895	39,720
1911	3	240	"	37,327	3,434	325	7,842	11,467	65,684
1912	3	265	"	36,037	5,710	1,226	12,468	12,476	71,162
1913	3	265	"	23,574	2,999	152	3,172	20,539	53,423
1914	4	265	"	31,327	2,660	725	9,276	25,333	94,890
1915	4	265	"	39,349	3,053	648	15,171	34,879	104,289
1916	4	265	"	31,411	3,061	784	19,139	59,593	126,686
1917	4	265	"	22,188	3,170	1,326	22,180	44,568	119,495
1918	6	265	"	21,816	2,332	1,003	17,060	59,206	143,908
1919	5	300	"	28,259	2,408	1,581	10,900	29,949	97,512
1920	5	342	"	16,740	3,584	789	3,700	43,151	81,153
1921	5	338	"	9,364	1,431	220	8,236	29,488	51,765
1922	5	304	"	31,277	1,466	255	3,533	75,687	124,071
1923	5	244	"	17,821	2,522	335	7,894	44,165	99,580

## PACK OF CANNED SALMON OF PUGET SOUND FROM 1887 TO 1923

STATEMENT No. 3.

Year	No. of canneries operated	Spring	Sockeye	Medium Red	Chum	Pink	Steelhead	Total
1887								22,000
1888	4	Particulars of varieties not available.	"	"				21,975
1889	2	240		7,480	1,145	2,890		11,674
1890	1	1,000		3,000	4,000			8,000
1891	2	382	5,538	5,869	3,093			20,529
1892	2	86	2,934	7,206	16,180	5,647		26,426
1893	3	1,200	47,852	11,812	11,380	17,530		89,331
1894	3		41,781	22,418	22,152	9,049		95,400
1895	7	1,542	65,143	50,865	38,785	23,633		179,968
1896	11	13,495	72,979	82,640	26,550			195,664
1897	12	9,500	312,048	91,900	23,310	57,268		494,026
1898	18	11,200	252,000	98,600	38,400			400,200
1899	19	24,364	499,646	111,387	31,481	252,733		919,611
1900	19	22,350	229,800	128,200	89,100			469,450
1901		Particulars of varieties not available.						1,380,590
1902	21	30,049	372,301	85,817	93,492			581,659
1903	22	14,500	167,211	108,450	12,001	181,236		478,488
1904	13	14,441	109,264	118,127	49,656			291,488
1905	24	1,804	825,453	79,335	41,057	70,902		1,018,641
1906	16	8,139	178,748	94,497	149,218			430,602
1907	14	1,814	93,122	119,372	50,249	433,423		698,080
1908	22	95,210	170,951	128,922	47,607	6,075		448,765
1909	11	13,019	1,097,904	143,133	53,688	370,993		1,632,949
1910	24	10,064	248,014	162,755	146,942	108		567,883
1911	15	21,823	127,761	256,124	104,321	1,046,992		1,557,029
1912	20	20,252	184,680	149,727	60,760	700		416,125
1913	22	1,234	1,673,079	61,019	56,225	791,886		2,583,463
1914	31	26,044	335,230	151,893	278,801	892		792,860
1915	41	28,466	64,548	180,783	411,724	583,649		1,269,206
1916	32	37,030	84,637	155,832	427,878	1,887		707,278
1917	45	57,543	411,538	114,276	216,285	1,124,884		1,921,554
1918	32	63,366	50,723	235,800	267,538	106		624,198
1919	35	68,542	64,346	210,883	525,541	421,215	5,076	1,295,626
1920	11	25,846	62,654	24,502	48,849	4,669		166,520
1921	23	25,567	102,967	89,412	30,831	404,713		653,490
1922	16	20,615	48,566	111,711	65,552	2,225		248,729
1923	18	15,777	47,402	122,000	97,081	475,849	29	758,138

COMPARATIVE STATEMENT OF FISHERY LICENSES ISSUED, SEASONS 1923 AND 1922  
SUMMARY—WHOLE PROVINCE OF BRITISH COLUMBIA. As at February 16, 1924.

STATEMENT No. 7.

Variety of License	Season, 1923						Season, 1922					
	Issued			Transferred from other districts:			Total operating in District:			Issued		
	Wh.	Ind.	Total	Wh.	Ind.	Total	Wh.	Ind.	Total	Wh.	Ind.	Total
Salmon Cannery.....	61	.....	61	.....	.....	.....	61	.....	61	64	.....	64
Salmon Curing.....	44	.....	49	.....	.....	.....	44	.....	49	52	.....	52
Salmon Trap-net.....	192	2	194	29	.....	.....	6	.....	6	4	.....	4
Salmon Purse-seine.....	31	.....	31	.....	.....	.....	223	2	223	143	.....	143
Salmon Drag-seine.....	1,468	1,094	3,755	.....	.....	.....	31	.....	31	36	.....	36
Salmon Gill-net.....	1,697	499	2,445	174	28	202	1,642	1,122	3,957	1,470	1,032	1,989
Salmon Trolling.....	74	6	176	1	.....	1	698	499	249	743	438	332
Boat (Buyer's).....	132	5	162	.....	.....	.....	74	6	96	77	6	165
Buyer's.....	342	539	881	.....	.....	.....	132	5	25	85	.....	41
Asst. Salmon Seine Boat.....	28	30	58	.....	.....	.....	342	539	881	.....	.....	.....
Capt. Salmon Seine Boat.....	121	343	962	.....	.....	.....	28	30	58	49	52	38
Asst. Salmon Gill-net.....	.....	.....	.....	.....	.....	.....	121	343	528	.....	.....	.....
Experimental Salmon Cannery.....	3	.....	3	.....	.....	.....	.....	.....	.....	2	.....	2
Herring Cannery.....	23	.....	29	.....	.....	.....	3	.....	3	.....	.....	.....
Herring Curing.....	37	.....	40	.....	.....	.....	23	.....	29	12	.....	12
Herring Purse-seine.....	3	.....	3	.....	.....	.....	37	.....	40	24	.....	24
Herring Drag-seine.....	21	.....	21	.....	.....	.....	3	.....	3	.....	.....	.....
Herring Gill-net.....	15	5	20	.....	.....	.....	21	.....	11	32	19	19
Capt. Herring seine boat.....	4	.....	4	.....	.....	.....	15	5	20	1	.....	1
Angling Permits.....	66	8	304	.....	.....	.....	4	.....	4	51	.....	51
Cod Hook and Line.....	96	19	318	.....	.....	.....	66	8	304	.....	.....	.....
Crab Fishery.....	11	3	33	.....	.....	.....	96	19	318	88	5	6
Grayfish Hook and Line.....	14	.....	14	.....	.....	.....	11	3	33	.....	.....	.....
Grayfish Gill-net.....	170	11	136	.....	.....	.....	14	.....	21	31	.....	39
Miscellaneous Licenses.....	3,659	2,564	2,623	204	28	232	170	11	136	162	12	229
Totals.....	.....	.....	8,846	.....	.....	.....	3,863	2,592	2,623	3,115	1,545	2,933
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,593

Totals.



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"	District No. 3— East coast..... Percentage.....	336	139	104	579	133 69.7	108 343.4					34 24.7	212 57.8	
"	West coast..... Percentage.....	175	256	144	575				51 22.6	42 14.1	48 25.0			141 19.7
"	Totals— District No. 3..... Percentage.....	511	395	248	1,154	87 20.5	66 20.1				82 25.0	71 6.6		
Boat.....	Whole province..... Percentage.....	74	6	96	176				3 3.9		69 41.9			72 29.0
Buyers.....	Whole province..... Percentage.....	132	5	25	162	47 55.3	5 Inf.				16 39.0	36 28.6		

## APPENDIX 2

## FISHERIES

## FINANCIAL STATEMENT, 1923-24

Vote No.	Service	Appropriation	Expenditure
		\$ cts.	\$ cts.
249	Salaries and disbursements of Fishery Officers, Fisheries Patrol Service, Fisheries Protection Service.....	880,000 00	807,189 08
250	Building fishways and clearing rivers.....	40,000 00	20,316 45
251	Legal and incidental expenses.....	4,000 00	656 16
252	Conservation and development of deep-sea fisheries.....	95,000 00	19,864 30
253	Fisheries Intelligence Bureau.....	2,000 00	958 19
254	Inspection of canned and pickled fish.....	25,000 00	23,122 99
255	Fish culture.....	370,000 00	350,487 34
256	Investigations into fisheries.....	15,000 00	5,553 28
257	Marine Biological Board.....	42,000 00	42,000 00
		1,473,000 00	1,270,147 79
	Civil Government salaries.....	99,820 00	93,521 58
	Contingencies.....	20,000 00	18,352 02
	Fishing bounty.....	160,000 00	159,916 80
		1,752,820 00	1,541,938 19
435	Cost of Living Bonus.....		58,618 51
	Superannuation No. 4, Retirement Act, 1920.....		5,456 95
	Gratuities.....		230 00
	Total net expenditure, 1923-24.....		1,606,243 65

# STATEMENT OF REVENUE RECEIVED DURING THE FISCAL YEAR 1923-24

[illegible]

## DETAILED STATEMENT—EXPENDITURE—SALARIES AND DISBURSEMENTS, 1923-24

Provinces	Inspector's Overseers and Ward's		Allowances				Gasoline and Oil	Special Guardians		Sundry	Total	
			Auto	Boat	Horse	Wages		Expenses				
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
<i>Eastern Division—</i>												
General account.....	9,558 84	1,704 82						280 00	18 45	50 91		11,613 02
Nova Scotia, G.A.....	3,120 00	372 15								116 00	3,608 15	
" No. 1.....	12,660 00	2,744 00	3,200 00	625 00			244 79	15,933 13	157 94	186 09	35,750 95	
" No. 2.....	16,140 00	2,977 14	4,328 89	250 00			104 93	6,573 01	252 50	111 80	30,911 60	
" No. 3.....	18,278 32	3,899 95	4,000 00	15 00				5,277 70	55 61	105 99	32,232 57	
Prince Edward Island, No. 1.....	7,903 38	1,970 26	1,600 00					4,402 21	470 00	304 36	16,410 21	
" " No. 2.....	2,331 00	726 45		225 00			299 10		300 00	4 88	3,886 43	
New Brunswick, No. 1.....	9,120 00	1,908 38	1,600 00	400 00			235 36	3,325 00		107 99	16,804 73	
" " No. 2.....	16,680 00	3,462 86	4,251 61	997 73			579 24	8,698 27	6 00	148 02	34,935 02	
" " No. 3.....	6,720 00	1,326 00	200 00	37 50			75 10	6,926 60		26 45	15,461 65	
	102,511 54	21,092 01	19,180 50	2,550 23	1,142 62	1,538 52	51,415 92	960 50		1,222 49		201,614 33
<i>Quebec.</i>										282 90		282 90
<i>Central Division—</i>												
General account.....	1,230 00	32 50								5 00		1,267 50
Manitoba.....	7,575 00	3,381 46		168 75	618 75			562 50	666 80	68 70		13,041 96
Saskatchewan.....	9,035 00	3,578 78	112 50	68 75	483 33			325 00	621 50	57 02		14,281 88
Alberta.....	7,908 11	3,154 34	112 50	168 75	450 00			820 00	783 15	312 97		13,709 82
	25,748 11	10,147 08	225 00	406 25	1,552 08			1,707 50	2,071 45	443 69		42,301 16
<i>British Columbia—</i>												
General account.....	19,610 38	1,304 09								4,093 46	25,007 93	
British Columbia, No. 1.....	10,165 66	8,647 70						7,758 93	1,815 41	1,368 41	29,756 11	
" " No. 2.....	11,921 71	3,322 55						3,547 33	731 95	2,090 56	21,614 10	
" " No. 3.....	14,137 45	7,438 37						4,018 04	1,124 35	589 61	27,612 46	
	55,835 20	20,712 71					304 64	15,324 30	3,671 71	8,142 04		103,990 60
General Account.....												20,455 77

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## SUMMARY

General Account.....	102,511 54	21,092 01	19,180 50	2,550 23	1,142 62	1,538 52	51,415 92	960 50	20,455 77	20,455 77
Eastern Division.....									1,222 49	201,614 33
Quebec.....	25,748 11	10,147 08	225 00	406 25	1,552 08		1,707 50	2,071 45	282 90	282 90
Central Division.....	55,835 20	20,712 71				304 64	15,324 30	3,671 71	443 69	42,301 16
British Columbia.....									8,142 04	103,990 60
	184,094 85	51,951 80	19,405 50	2,956 48	2,694 70	1,843 16	68,447 72	6,703 66	30,546 89	368,644 76

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## DETAILED STATEMENT FISHERIES PATROL SERVICE EXPENDITURE, 1923-24

Establishments and Accounts	Paylist \$ cts.	Board or Prov'n. \$ cts.	Fuel \$ cts.	Repairs		Supplies			Clothing \$ cts.	Sundry		Total \$ cts.
				Hull \$ cts.	Engine \$ cts.	Engine \$ cts.	Deck \$ cts.	Stewards \$ cts.		\$ cts.	\$ cts.	
<i>Eastern Division—</i>												
<i>Nova Scotia</i>												
"Mildred McColl"	3,519 93	2 10	1,130 26	136 01	65 44	238 58	54 33	48 82	2 68	71 05	5,269 20	8,699 93
"A"	2,105 87	29 78	441 99	62 66	415 87	85 56	52 72	65 07		16 21	3,275 73	
"B"										5 00	5 00	
"E"										150 00	150 00	
<i>Prince Edward Island</i>												1,590 55
"Ostrea"				151 70		58 23		1 30		304 80	516 03	
"D"										25 00	25 00	
"Richmond"	779 58		105 00		8 67	43 99	72 08	0 39		39 81	1,049 52	
<i>New Brunswick</i>												12,602 99
"Togo" (chartered boat)	1,505 00		423 83			37 68	4 70	21 00		351 66	2,343 87	
"C"	1,657 62	9 75	414 89	461 13	59 32	117 82	23 55	6 13		242 40	2,992 61	
"G"										43 07	43 07	
"Phalarope"	3,838 77		913 97	89 91	138 80	200 53	58 97	85 70	38 07	19 42	5,384 14	
"Shannon"	1,075 00		234 86	0 96			10 78			202 60	1,524 20	
"Vendetta"			20 05	163 00	41 05					91 00	315 10	
	14,481 77	41 63	3,684 85	1,065 37	729 15	782 39	277 13	228 41	40 75	1,562 02		22,893 47
<i>Central Division—</i>												
"Bradbury"	9,896 33	2,647 83	5,748 98	3 19		239 38	791 12	182 98	354 79	186 65		20,051 25
<i>British Columbia Division—</i>												
General account	140 00		302 18	5 90	250 00	3 25	32 03	3 57	8 86	12,369 74		13,115 53
Digby Island Shop	3,027 50		32 55					2 19		152 55		3,214 79
Sapperton Warehouse	2,520 00		79 98			98 00		9 20	31 50	6 00		2,739 68
<i>Chartered Boats</i>												66,757 00
"Akashi"	926 21		357 72			50 75				1,270 00	2,604 68	
"Annie C."	733 07		70 58			5 99		4 16		497 85	1,311 65	
"Aramac"	364 94		76 00			55 00				108 00	603 94	
"Bluebird"	316 67		76 60			6 50		0 50		98 00	498 27	
"Clare"	345 00		83 56			6 49		1 58		368 00	804 63	
"Corycia"	123 33		39 18			3 90		2 10		39 00	207 51	
"Dustie"	578 71		103 41			14 34		4 94		770 00	1,471 40	
"Elk"			61 79			18 08		1 54		138 00	219 41	
"Elkhart"	899 77		126 29			25 08				526 00	1,577 14	
"Esperanza"	720 00		337 50			51 95				219 00	1,328 45	
"Flier"	248 71		9 00							42 00	299 71	

"Frisbie"	460 00	51 69	10 27	1 04	610 00	1,133 60
"Gene"	1,152 16	303 82	65 37		1,220 00	2,741 35
"Gosum"	223 33	223 33	17 45		67 00	358 29
"Grace B."	277 85	50 51			119 19	397 04
"Hillier"	153 34	11 11	2 63		48 00	215 08
"Iona"	795 00	221 65	26 15	3 50	648 00	1,694 30
"Joybird"	564 19	145 88	11 19	11 16	616 00	1,348 42
"Kathalma"	2,696 77	1,203 88	190 68	63 36	2,832 74	7,670 28
"Lady"	626 04	33 03	0 72		23 06	
"Leach"	506 45	40 45	4 70		158 50	710 10
"Leach"	400 32	159 00	13 50		121 00	693 82
"Leish"	678 95	224 45	58 84	6 32	948 10	1,919 16
"Mable"	10 90	7 25				18 15
"Marie S."	1,255 63	241 17	26 18	6 82	1,148 00	2,677 80
"Murrellette"	645 97	617 28	64 90	4 04	1,008 00	2,340 19
"Nicolson"	1,100 00	181 51	36 09		357 75	1,675 35
"Noothalk"	914 51	284 27	22 27	3 35	854 00	2,078 40
"Odessa"	800 47	178 15	16 55		904 85	1,915 02
"Olive"	466 67	107 14	21 21		145 55	740 57
"Oyashimo"	978 95	143 15	18 92	7 76	1,080 00	2,228 78
"Pinte"	94 09	1 70	9 75		30 00	125 79
"Pioneer"	377 85	73 25	8 45		116 00	576 85
"Rambler"	412 50	62 50			280 00	763 45
"Regal R."	497 85	107 33			600 00	1,205 18
"Reliance"	1,184 35	150 89	8 61	3 96	848 00	2,195 51
"Result"	419 91	259 20	62 08	8 80	161 20	911 19
"Rhoda"	322 58	88 00	4 00		100 00	514 58
"Robertson"	8 40	3 90				12 30
"Rover"	345 00	168 08	29 44		400 00	1,002 52
"Sea-Dog"	15 50	203 33	5 63		63 00	287 46
"Seafloat"	675 00	215 82	28 67	6 29	921 16	1,846 94
"Seal Cove"		112 26	33 78	3 24	16 00	165 28
"644"		16 88	9 79			26 67
"Sophann"	795 00	226 91	34 90	2 25	894 00	1,923 06
"Stubbs"	300 00	72 60	22 50		92 00	487 10
"Swing"	784 16	142 13	16 43	3 16	1,032 00	1,977 88
"Teal"	380 00	4 55	0 35		1,453 50	838 40
"Ukatav"	734 29	250 99	36 81	3 16	1,100 00	2,125 25
"Vera S. Fry"	413 71	165 43	20 25		570 00	1,169 39
"Wabash"	795 00	677 44	59 75	1 64	1,283 70	2,817 53
"We-Two"	750 00	339 59	59 30	2 25	256 00	1,407 14
"Wolny"	401 00	29 95	3 44		213 50	647 89
"W. T."	170 00	20 05	6 10		51 00	247 15
Departmental Boats.						144,485 37
"Anina"		92 37	173 14	4 21	2 25	403 02
"Babine No. 1"		8 50	68 67	6 00	95 93	991 51
"Babine No. 2"		4 22	27 18	2 85	59 20	988 78
"Black Raven"		189 09	302 14	2 69	125 58	3,888 86
"Bonila"		996 90	147 47	83 57	65 67	6,041 00
"Cloyah"		1,056 51	2,488 89	25 40	6 60	6,686 56
		5,650 00	697 27	17 05		

## DETAILED STATEMENT FISHERIES PATROL SERVICE EXPENDITURE, 1923-24—Concluded

Establishments and Accounts	Paylist \$ cts.	Board or Prov'n. \$ cts.	Fuel \$ cts.	Repairs		Engine \$ cts.	Supplies		Clothing \$ cts.	Sundry \$ cts.	— \$ cts.	Total \$ cts.
				Hull \$ cts.	Engine \$ cts.		Deck \$ cts.	Stewards \$ cts.				
<i>British Columbia Division—Con.</i>												
<i>Departmental Boats—Con.</i>												
"Cohoe".....	718 95		302 48	254 22	355 14	90 81	16 73	70 16		118 54	1,936 05	
"Egret".....	1,500 00		240 27	564 61	935 84	2,082 64	41 25	150 15		94 00	5,608 76	
"Elk".....	2,804 52		543 85	217 20	124 02	72 40	0 50	22 54		5 65	3,790 68	
"Fispa".....	55 00		71 38			71 51	5 80	3 08	4 29	565 26	786 52	
"Foam".....	5,040 00		755 36	306 38	387 42	75 51	193 09	30 70		230 02	7,018 48	
"Givenchy".....	25,755 16	7,023 49	11,582 39	3,448 56	1,730 70	1,231 48	701 15	1,640 06	1,659 74	915 40	55,688 13	
"Gull".....	944 84		572 15	561 51	421 74	57 05	33 25	61 51		122 62	2,774 67	
"Hawk".....	1,601 01		693 50	240 32	22 69	121 42	18 70	50 36		14 00	2,762 00	
"Heron".....	1,399 10		403 92	305 03	75 67	54 93	30 60	20 00		35 80	2,325 05	
"Humming Bird".....			5 17		1 65	6 38					13 20	
"Kayex".....				7 51	28 33					81 00	116 84	
"Linnett".....	1,497 02		524 63	190 55	25 75	104 29	52 60	23 41		67 55	2,485 80	
"Marfish".....	6,394 66	1,613 52	1,873 73	2,546 52	502 51	265 71	117 95	307 13	158 81	498 57	14,279 11	
"Merlin".....	1,234 51		390 10	736 15	50 16	86 13	38 92	19 63		53 40	2,600 00	
"Merrysea".....	4,650 65		1,169 19	46 77	1,096 50	121 72	53 85	85 72		145 25	7,369 65	
"Ptarmigan".....				2 30			1 00				3 30	
"Revidis".....					341 43	288 43				1 52	631 38	
"Semishmo".....	1,890 00		19 81		10 52	8 34		13 10		14 89	1,956 66	
"Swan".....	4,740 00		777 85	215 13	967 55	59 66	13 70	24 88	3 79	43 72	6,846 28	
"Vanidis".....					341 44	288 44			14 85	2 78	647 51	
"Vedder".....	1,350 00		199 10	1,631 91	210 10	1,849 70	180 94	297 46	8 74	108 62	5,836 57	
General Account.....	101,854 29	9,263 05	31,677 06	17,336 80	9,858 49	11,149 24	1,629 02	3,136 56	1,932 16	42,475 70		230,312 37
						11,953 00				2 58		11,955 58

## SUMMARY

Eastern Division.....	14,481 77	41 63	3,684 85	1,065 37	729 15	782 39	277 13	228 41	40 75	1,562 02		22,893 47
Central Division.....	9,896 33	2,647 83	5,748 98	3 19		239 38	791 12	182 98	354 79	186 65		20,051 25
British Columbia Division.....	101,854 29	9,263 05	31,677 06	17,336 80	9,858 49	11,149 24	1,629 02	3,136 56	1,932 16	42,475 70		230,312 37
General Account.....	126,232 39	11,952 51	41,110 89	18,405 36	10,587 64	24,124 01	2,697 27	3,547 95	2,327 70	44,226 95		285,212 67

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## FISHERIES

## DETAILED STATEMENT FISH CULTURE EXPENDITURE, 1923-24

Hatcheries	Salaries	Maintenance	Total of hatchery	Total of provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Nova Scotia—</i>				
Bedford.....	1,260 00	15,217 47	16,477 47	
Lindloff.....		1,119 55	1,119 55	
Margaree.....	3,600 00	4,212 52	7,812 52	
Margaree Pond.....		4,641 57	4,641 57	
Middleton.....	2,460 00	5,761 75	8,221 75	
Windsor.....	1,320 00	2,802 17	4,122 17	
	8,640 00	33,755 03		42,395 03
<i>Prince Edward Island—</i>				
Kelly's Pond.....	2,640 00	2,219 03	4,859 03	4,859 03
<i>New Brunswick—</i>				
Grand Falls.....	2,482 67	2,809 02	5,291 69	
Miramichi.....	2,940 00	2,254 88	5,194 88	
Miramichi Pond.....		3,768 57	3,768 57	
Nepisiquit.....		482 24	482 24	
New Mills Pond.....	380 00	4,455 60	4,835 60	
Restigouche.....	2,820 00	3,199 20	6,019 20	
Sparkle.....		547 98	547 98	
St. John.....	2,947 67	3,785 80	6,733 47	
St. John Pond.....		7,783 14	7,783 14	
Tobique.....		213 34	213 34	
	11,570 34	29,299 77		40,870 11
<i>Ontario—</i>				
Collingwood.....	3,390 00	9,299 83	12,689 83	
Kenora.....	4,051 00	9,348 27	13,399 27	
Kingsville.....	3,472 50	4,932 60	8,405 10	
Port Arthur.....	4,398 00	2,579 68	6,977 68	
Sarnia.....	3,900 00	4,832 66	8,732 66	
Southampton.....	3,270 00	3,922 89	7,192 89	
Thurlow.....	5,025 00	12,963 44	17,988 44	
Warton.....	3,884 48	4,910 52	8,795 00	
	31,390 98	52,789 89		84,180 87
<i>Manitoba—</i>				
Dauphin River.....	2,655 00	4,506 42	7,161 42	
Dauphin River Spawn Camp.....		1,100 64	1,100 64	
Gull Harbour.....	1,680 00	5,076 13	6,756 13	
Winnipegosis.....	2,125 00	11,286 70	13,411 70	
	6,460 00	21,969 89		28,429 89
<i>Alberta—</i>				
Banff.....	2,405 32	2,834 69	5,240 01	
Spray Lakes.....	39 84	1,139 31	1,179 15	
	2,445 16	3,974 00		6,419 16
<i>Saskatchewan—</i>				
Qu'Appelle.....	2,289 84	4,691 54	6,981 38	6,981 38

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## DETAILED STATEMENT FISH CULTURE EXPENDITURE, 1923-24—Concluded

Hatcheries	Salaries	Mainten- ance	Total of hatchery	Total of provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>British Columbia—</i>				
General Account.....	6,987 81	4,539 16	11,526 97	
Anderson.....	1,279 35	7,091 57	8,370 92	
Babine.....	810 00	8,089 80	8,899 80	
Cowichan.....	927 91	5,784 73	6,712 64	
Cranbrook Eyeing Station.....		77 05	77 05	
Cultus.....	532 91	5,322 87	5,855 78	
Gerrard.....		3,399 45	3,399 45	
Harrison.....	2,361 77	7,857 21	10,218 98	
Kennedy.....	1,301 81	5,731 41	7,033 22	
Lloyd's Creek Eyeing Station.....	85 00	1,246 63	1,331 63	
Nelson Eyeing Station.....	840 00	2,585 56	3,425 56	
New Westminster.....		0 70	0 70	
Pemberton.....	2,042 74	11,304 38	13,347 12	
Pitt.....	510 00	7,346 35	7,856 35	
Rivers Inlet.....	1,659 00	16,212 83	17,871 83	
Skeena.....	482 74	9,702 38	10,185 12	
Stuart.....	720 00	4,349 71	5,069 71	
	20,541 04	100,641 79		121,182 83
<i>General Account.....</i>	5,500 00	9,669 04	15,169 04	15,169 04
	91,477 36	259,009 98		350,487 34

## SUMMARY

Nova Scotia.....	8,640 00	33,755 03	42,395 03
Prince Edward Island.....	2,640 00	2,219 03	4,859 03
New Brunswick.....	11,570 34	29,299 77	40,870 11
Ontario.....	31,390 98	52,789 89	84,180 87
Manitoba.....	6,460 00	21,969 89	28,429 89
Alberta.....	2,445 16	3,974 00	6,419 16
Saskatchewan.....	2,289 84	4,691 54	6,981 38
British Columbia.....	20,541 04	100,641 79	121,182 83
General Account.....	5,500 00	9,669 04	15,169 04
	91,477 36	259,009 98	350,487 34

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## FISHERIES

## DETAILED STATEMENT FISHERIES PROTECTION SERVICE EXPENDITURE, 1923-24

Establishments and Accounts	Paylist \$ cts.	Board or Prov'n. \$ cts.	Fuel \$ cts.	Repairs		Supplies		Clothing \$ cts.	Sundry \$ cts.	— \$ cts.	Total \$ cts.
				Hull \$ cts.	Engine \$ cts.	Engine \$ cts.	Deck \$ cts.	Stewards \$ cts.			
<i>Eastern Division—</i>											
"Arleau".....	18,400 55	4,880 92	7,691 77	4,487 07	281 40	756 55	509 41	452 15	834 89	39,258 25	
"Arras".....	20,459 38	5,451 31	9,836 06	2,782 44	2,661 38	1,029 79	350 72	327 63	1,197 71	44,878 10	84,136 35
	38,949 93	10,332 23	17,527 83	7,269 51	2,942 78	1,786 34	860 13	779 78	2,032 60		84,136 35
<i>Great Lakes—</i>											
"Becancour".....										23 00	
"Laviolette".....			320 62							332 62	355 62
			320 62								355 62
<i>Western Division—</i>											
"Malaspina".....	30,012 84	7,218 29	13,672 72	2,933 10	2,066 34	928 08	646 50	1,392 73	1,088 13	61,483 34	
"Thiepval".....	1,942 58	729 38	1,445 70	264 37	267 41	278 06	213 74	230 37	144 65	5,804 48	67,287 82
	31,955 42	7,947 67	15,118 42	3,197 47	2,333 75	1,206 14	860 24	1,623 10	1,232 78		67,287 82
General Account.....									1,345 69	206 17	1,551 86
SUMMARY											
Eastern Division.....	38,949 93	10,332 23	17,527 83	7,269 51	2,942 78	1,786 34	860 13	779 78	1,655 22	2,032 60	84,136 35
Great Lakes.....			320 62							35 00	355 62
Western Division.....	31,955 42	7,947 67	15,118 42	3,197 47	2,333 75	1,206 14	860 24	1,623 10	1,232 78		67,287 82
General Account.....	70,905 35	18,279 90	32,966 87	10,466 98	5,276 53	2,992 48	1,720 37	2,402 88	4,813 74	3,506 55	153,331 65



## APPENDIX 3

REPORT ON FISHWAYS AND REMOVAL OF OBSTRUCTIONS FOR  
YEAR ENDING DECEMBER 31, 1923, BY CHAS. BRUCE,  
FISHERIES ENGINEER

The spring of 1923 was a particularly unfortunate one as regards fishways, owing to heavy freshets. In some instances structures that had been in operation for a number of years, as well as the dams in which they were installed, were either seriously damaged or broken down entirely.

The following dams in the Maritime Provinces were inspected by the fisheries engineer during the year:—

## • SALMON RIVER, VICTORIA COUNTY, N.B.

- (a) Joseph Cote—Saw-mill dam.
- (b) Terrialt—Grist-mill dam.
- (c) Davis Lumber Company—Saw-mill dam.
- (d) Davis Lumber Company—Storage dam.

The necessary surveys were made at each of these dams, and plans and specifications prepared from which fishways will be installed in 1924.

## NASHWAAK RIVER, YORK COUNTY, N.B.

- (a) Nashwaak Pulp and Paper Company—Dam at Marysville.

Freshets had almost completely destroyed this fishway, and it was necessary to rebuild it. As conditions for the ascent of fish had never been satisfactory, it was decided to build the new fishway at another location in the dam. Plans and specifications were prepared and arrangements made with the company for the construction, which was completed in October.

## BECAQUIMEC RIVER, CARLETON COUNTY, N.B.

- (a) The dam and fishway owned by the Sayre Lumber Company at Hartland were seriously damaged by the freshets in the spring. Repairs were effected by the company during the summer.

## ST. CROIX RIVER, YORK COUNTY, N.B.

- (a) A low dam at the foot of Grand lake, owned by the St. Croix Pulp and Paper Company, was inspected. The fishway which is situated on the Canadian side of the international boundary was found to be entirely out of commission, the materials of which it was built being rotted away.

It is considered that a suitable fishway in the form of a ditch could be constructed with not greater expense and certainly more permanency on the American side of the dam. The Commissioner of Fisheries for the State of Maine was communicated with, requesting him to take the matter up as it is outside of the jurisdiction of this department. The dam in question prevents the passage of land-locked salmon which are in the river in quite large numbers.

- (b) The International Joint Commission rendered its decision requiring that the St. Croix Gas and Electric Light Company, and the Canadian Cottons Limited, owners of dams on the river at or near St. Stephen, to build fishways therein, from plans approved by both the American and Canadian Fisheries Departments.

## MIRAMICHI RIVER, NORTHUMBERLAND COUNTY, N.B.

(a) Provision was made to have the owners build a fishway in a low dam on the Taxes river, a tributary stream entering the southwest Miramichi river at Boisetown.

(b) An examination was made of the dam on the Bartholomew river, a tributary to the southwest Miramichi, to determine if a fishway should be built therein. On account of the unfavourable reports of this river for spawning purposes, it was decided that a fishway should not be required.

## GRAND RIVER FALLS, RICHMOND COUNTY, N.S.

A fishway was built over these falls a number of years ago which has since fallen into disuse. A survey of the structure was made and information obtained from which reconstruction will be carried out next year when water conditions are suitable.

## SHEET HARBOUR RIVER, HALIFAX COUNTY, N.S.

The conditions for the construction of a fishway in the dam under construction by the Nova Scotia Hydro-Electric Commission were examined. There appears a fairly favourable opportunity for a partially natural fishway over the falls with some construction to get by the dam. The commission's engineer was interviewed and the situation fully discussed with him. Arrangements were made to have the fishway built, but its efficiency will be a matter to be determined after the power plant is in operation.

## LAWRENCETOWN RIVER, HALIFAX COUNTY, N.S.

The old dam between Echo lake and lake Martin on the above river was removed providing a free passage for fish.

## MUSHAMUSH RIVER, LUNENBURG COUNTY, N.S.

A set of revolving paddles was placed in the tailrace from the power house of the hydro-electric station. This was done with a view to preventing the ascent to salmon up the tailrace canal, and to direct them into the fishway.

Construction was completed too late in the season to determine the efficiency of this work, but it will be followed closely during the run of salmon next season.

## MEDWAY RIVER, LIVERPOOL COUNTY, N.S.

Some repairs were carried out at the fishway in the pulp mill dam at Salters falls to remedy breaks that had occurred in the walls of the fishway. Reports show that this fishway was satisfactorily operated during the past season, both salmon and alewives ascending the river in numbers.

## MERSEY RIVER, LIVERPOOL COUNTY, N.S.

Extensive construction was done on all the fishways on this river.

In the first dam a large fishway was built at the westerly end.

In the second dam a somewhat similar fishway was built at the easterly end.

The existing fishway in the third dam was enlarged, and the partitions rebuilt with a view to providing deeper water and easy runs between the pools.

The existing fishway in the fourth dam was extended further into the river with a view to making access easier during low water. The pool into which

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the fishway discharges was also improved by closing the openings in a ledge of rock below the dam and directing the flow through one main channel.

The existing fishway in the fifth dam was enlarged and extended further into the river with a view to making access easier during low water.

All work in connection with the above fishways was constructed in stone and concrete in order to assure permanency.

## CLYDE RIVER, SHELburnE COUNTY, N.S.

A new fishway was built in the pulp company's dam on the Clyde river at Queens, to replace the one destroyed by ice during the spring freshets.

## JORDAN RIVER, SHELburnE COUNTY, N.S.

A survey was made of the second dam on the river where the old fishway was destroyed by freshets. Plans will be prepared for a new fishway, and construction will be carried out next season.

## ROUND BAY RIVER, SHELburnE COUNTY, N.S.

In response to a petition from local residents urging that a new channel through the beach would greatly improve the passage for fish, a survey of the situation was made.

The result of this survey showed that in so far as the fisheries are concerned the present channel is adequate. As the greatest damage from the changed conditions, due to the shifting of the river's mouth, was to the lands behind the beach which had been submerged to the extent of a number of acres thereby, it was considered that any action looking to improvements would be a matter for the consideration of the Department of Public Works and recommendation was made accordingly.

In the province of Manitoba, where conditions for the ascent of fish at a number of dams were complained of, an inspection was made by an engineer from the department. The fishways have been built largely on ideas of the Inspectors and Overseers, and in some instances are entirely unsuitable for the varieties of fish using them.

Owing to the pressure of work the engineering staff was unable to give the renewal of any of these fishways attention during the low water of last summer.

As, however, the attention of the department was directed particularly to those on the Whitemud river, the repair of these is being undertaken during low water this winter.

Numbers of requests for information regarding fishway construction were received from private individuals as well as from the Newfoundland Government. As complete information as possible, in the light of the department's experience, was furnished to all inquiries.

The practice of receiving monthly reports on the condition of fishways in their districts from fishery overseers has been continued, thus keeping the department in touch with their operation.

Appended hereto is a copy of the report by the Resident Engineer McHugh for the British Columbia Division, covering the work performed during the year ending December 31, 1923.

## BRITISH COLUMBIA

## (1) REMOVAL OF OBSTRUCTIONS

The various streams from which obstructions have been removed, and the expenditure involved in each case during the year are detailed as follows:—

*Deer Passage Creek, Bella Bella District, \$500.*—Removal of debris left in stream bed after discontinuance of logging operations, and concentration of reduced summer flow to a single channel.

*Gullchuck, Bella Bella District, \$536.*—Easing the ascent of a fall approximately 10 feet in height by the blasting of pockets or pools.

*Tinkev Creek, Bella Bella District, \$410.*—Continuance of the work commenced in the previous year for the purpose of easing the ascent of salmon over numerous rock ledges at low water periods.

*Kisimete River, Bella Bella District, \$1,572.*—Continuance of the work commenced in the previous year for the purpose of easing the ascent of salmon over falls. Several falls exist in the bed of this stream, one being 12 feet in height.

*Kiltik Creek, Bella Bella District, \$125.67.*—The removal of a jam of spruce roots and logs which effectually closed the mouth of this stream.

*Thurston Bay Creek, Upper Valdez Island, \$768.21.*—Removal of debris deposited in the stream bed by loggers, and the blasting of boulders and ledge rock to facilitate the ascent of salmon.

*Puntledge River, Vancouver Island, \$492.65.*—The continuance of the work commenced in the previous year for the purpose of confining the stream, in sections, to a central channel. A large proportion of the volume of this stream, during summer flow, is taken for power development in connection with the works of the Canadian Collieries, Limited. This water is taken from the river at a point approximately half a mile below Comox lake and is returned to the river after running through the turbines some distance below. Portions of the river lying between these two points are of extreme width, and the bed thereof consists of ledges of shelving rock, which, during low water periods, can be crossed without wetting the feet. The excavation of channels for the concentration of water, particularly where abrupt falls exist, then becomes necessary, and it is work of this nature which has in the past been the cause of expenditure on this stream.

Now that the impounding dam at the foot of Comox lake has been rendered passable to salmon by the construction of a fishway in the dam, more work of similar nature on this stream may become necessary from time to time, as the runs of salmon to the lake gradually increase.

This will be more than ever necessary should there be good returns in due time from the planting of sockeye eggs in the Cruikshank river, draining into Comox lake.

*Demanuel Creek, Sooke Harbour District, \$237.*—Removal of a log jam in the stream bed which effectually held up the passage of salmon to the waters beyond. This work was successfully performed at very little cost, under contract, and salmon are now able to continue their way unmolested to the upper waters.

*Kakweiken River, Alert Bay District, \$634.70.*—Continuance of the work of easement of the falls located in the bed of this stream performed under the supervision of the overseer of the Alert Bay district, who remarks in his reports upon the efficiency of the work performed.

*Owens Bay, Okishollow Channel, Quathiaski District, \$207.75.*—The removal of debris let in the stream bed by loggers, and which effectively closed the stream to the further ascent of salmon.

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In addition to the above are several smaller expenditures, as detailed below, each amounting to less than \$100, which have been incurred in various parts of the province and performed under the supervision of the local overseers or guardians. In the majority of these cases the work is straight-forward, requiring nothing but diligent labour in its execution, and unless one of the engineers happens to be in the vicinity at the time such work is being done, it is not generally considered necessary to incur the expense of making a special visit to the ground. The overseer's report being in such circumstances accepted.

Lardeau river.....	\$65 71
Skutz falls.....	5 40
Cameleon Harbour creek.....	55 00
Heydon Bay creek.....	55 00
Quatsi river.....	27 00
Embley lagoon.....	55 00
Little river.....	22 50
Rivers Inlet district.....	45 96

## (2) CONSTRUCTION AND MAINTENANCE OF FISHWAYS

*Repairs to Meziaden River Fishway, \$6,999.38.*—This expenditure was incurred owing to the necessity of reconditioning the fish ladder at this point, through which salmon pass on their journey to the spawning grounds on Meziaden lake (headwaters Naas river).

The fishway was constructed under the supervision of the Public Works Department of the provincial government for this department, ten years ago, and consists of an open cut in the bank of the Meziaden river adjacent to the big falls, through a strata of rock which is overlaid by a heavy bank, some 50 feet high, of hard-pan, gravel and soft sand. At the time of construction this soft material was intended to be held in place by the construction of a facing of logs supporting the hard-pan strata adjoining the rock, having log stretchers penetrating the bank to hold the logs in place.

In the course of time some of these logs began to show signs of rot and commenced to bulge badly in the centre, quantities of soft material from above sliding over the bank and into the fish ladder. Whilst a great proportion of this material was carried away safely by the velocity of the water flowing through the fish ladder, yet a proportion of the boulders which were incorporated therein remained in the fishway, gradually filling the pockets.

In the fall of 1918 it became necessary to insert timber struts to support this skeleton log crib, and since that year further struts have been added from time to time. The necessity for the rebuilding of a more or less permanent structure around the base of this soft material became more apparent each year, until arrangements were completed during the year under review for the work to be done. Three alternative plans, varying in estimated cost, were placed before the department, and it was finally left to the judgment of the engineer in charge to adopt whichever scheme seemed most suitable after arriving on the ground in the spring.

The work was commenced early in June of 1923. All struts and old facing logs were first removed, and approximately 1,000 yards of soft material excavated, and sluiced down the stream, and an entirely new double crib, 120 feet in length and 8 feet in width, and varying from 8 feet to 14 feet in height, was constructed of green sound peeled jack pine. This was loaded with rock, brush and gravel and securely anchored to a solid rock foundation 10 feet wide, both front and rear, with split iron keys. The upper bank was then trimmed to a uniform slope and the excess material disposed of. By the construction of a temporary dam at the mouth of the fishway, the water from the fishway was diverted to the river and all pockets were entirely cleaned of their debris.

This whole work was accomplished under an expenditure of \$500 less than the estimated cost and can be considered as permanent since the life of the crib is conservatively placed at twenty-five years. It might be added that the difficulties of transportation in this part of the country added considerably to the cost of this work, material and supplies having to be taken in over pack-horse trails at heavy expense.

Special trips were made during the year to the following points for the purpose of investigating conditions on streams which had been reported to contain obstructions to the free ascent of salmon: Smiths inlet; Hemming bay (Quathiaski district); Owekano lake (Rivers Inlet district); Nahatlatch river (Fraser River district); Quay river (Bella Bella district); Hells gate (Fraser River district).

The preparation of reports and sketches covering the details thereof where necessary followed immediately on these examinations for further consideration by the department.

## APPENDIX 4

## REPORTS ON THE C.G.S. "ARLEUX" AND C.G.S. "ARRAS"

## REPORT OF CAPTAIN WM. J. MILNE, OF THE "ARLEUX," FOR 1923

The *Arleux* was outfitted and made ready for sea during the first part of April.

On the 22nd she proceeded to the assistance of a French trawler ashore on Thrumcap shoal but did not succeed in refloating her. She then proceeded westward.

May 8, patrolling the bay of Fundy where a large number of craft were fishing for lobsters and scallops off the Digby shore. Quantities of lobsters, under the legal size, which had been caught and concealed were located. On the New Brunswick coast all fish, except gaspereaux, were scarce.

Proceeded to the south shore of Nova Scotia on May 18 to watch the American seiners.

On May 25 we cruised westward, off Sambro, with a large fleet of United States seiners composed of schooners, trawlers and small steamers.

On June 25 the *Arleux* towed a disabled fishing craft into Lunenburg harbour, then went to the assistance of a fishing schooner ashore in that harbour and towed her afloat.

We then proceeded to the bay of Fundy and saw several craft scallop fishing outside of territorial waters. These boats were making good catches. We patrolled the bay searching the shores for illegal lobster fishing and other breaches of the law.

Arrived in Halifax, after patrolling the Atlantic coast, on July 21 to have the boiler welded and prepare for a cruise under the direction of the Biological Board.

On August 3 Dr. Huntsman and party came on board and we proceeded to cruise taking plankton observations, tidal surveys, etc., off the coasts of Nova Scotia, Labrador and Newfoundland. These observations were completed on the 21st of September and we proceeded to St. Andrews calling at Canso, Halifax and Lockeport on the way.

We reached St. Andrews on September 26, and landed the Biological officers and their apparatus, and then proceeded to fisheries protection duty, patrolling the bay of Fundy, watching the scallop fishermen and sardine carriers and searching for new scallop beds.

On October 13 off Briar island we proceeded to the assistance of the *Aberdeen* ashore on Seal island

We assisted in the international fishing schooner race off Halifax on October 30 and then followed the fall fleet of American seiners. The latter left for home on November 12.

We then proceeded to the entrance to the bay of Fundy and found a new scallop bed off the Lurcher.

Returning to the Atlantic coast and watching American fishermen until December 7, when we proceeded to Canso to assist the fleet of small vessels and boats fishing out of that port.

Haddock fishing was continued until January 30 out of Canso, the latest date recorded at that point.

On February 5 the *Arleux* was placed in winter quarters at Lunenburg.

## GENERAL

During the season the shores of the western district were searched for illegal lobster fishing. Fewer instances of this were found than in the previous year.

Good catches of scallops were made by boats fishing outside of territorial waters during the close season in the bay of Fundy. We steamed amongst these boats keeping them the required distance from shore.

Sardines were scarce, especially late in the year off the New Brunswick shores. A number of lobster fishermen in the western part of Nova Scotia depend on the fall run of sardines for their lobster bait. Should this supply prove inadequate bait could be obtained by sending craft to Browns Bank to seine or net herring in the early spring as numerous herring schools are located there then.

The *Arleux* steamed 13,621 miles, and was under weigh 1,700 hours during the season.

#### REPORT OF CAPT. C. BARKHOUSE, OF THE *Arras* ON THE MACKEREL SCOUTING DURING THE SPRING OF 1923

- May 13.—*Arras* has located mackerel 25 miles south of cape Sable. The fish are approaching the coast from the southwest. Will endeavour to follow movements of fish to-night.
- May 13.—*Arras* on mackerel scouting duties noon. Position fifteen miles south cape Roseway. No mackerel sighted yet but prospect good. Mackerel feed showing on water. Weather moderate. Southwest wind with heavy south swell.
- May 14.—*Arras* position 8 p.m. 10 miles south cape Negro on scouting duties.
- May 15.—*Arras* at Shelburne. Weather unfit for scouting and returned to harbour. Will proceed soon as weather clears.
- May 16.—Twenty miles southeast of cape Sable. Increasing south winds and overcast. Returning to Sand point until weather clears. No fish sighted.
- May 17.—*Arras* at Shelburne. Dense fog on coast. Will proceed scouting soon as weather clears.
- May 18.—*Arras* position 2 p.m. to-day, 25 miles south southwest cape Sable. Weather fine. Good prospects for mackerel.
- May 19.—*Arras* position noon to-day, 40 miles southeast by south from cape Sable. Have located large body of mackerel between Browns and Little LaHave banks. These fish are moving slowly northeast towards coast Nova Scotia.
- May 20.—*Arras* position 10 a.m. western side of Roseway bank. Increasing easterly winds. Unfit for scouting work. Proceeding to Shelburne.
- May 21.—*Arras* at Shelburne. Weather unfit for scouting. Proceeding when weather moderates.
- May 22.—*Arras* position noon 18 miles southeast cape Negro. Small lots of mackerel showing, going east. Spoke Lockeport netter Grace MacKay and reported taking 30 large mackerel last night. Also netter Nellie Banks of Lockeport reported 11 large mackerel. Fish now 15 to 20 miles off coast.
- May 23.—Two-thirty p.m. on western edge Roseway bank. No mackerel sighted. Weather conditions unfavourable.
- May 24.—Ten a.m. off Little Hope. No mackerel sighted.
- May 25.—*Arras* position 6 p.m. south from Little Hope. No fish sighted, American mackerel seiners have arrived on our coast. Two American beam trawlers fitted with purse seine are with fleet.

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- May 26.—*Arras* position 10 a.m. 15 miles south cape Roseway. Plenty mackerel showing and going east. Lockeport netters Grace MacKay reports taken 400 large mackerel last night and Nellie Banks taken 1,000 large mackerel. These fish taken 15 miles south Roseway.
- May 28.—Eight-thirty a.m. 17 miles southeast from Lockeport located large body mackerel going slowly eastward. Weather fine for observation.
- May 28.—Position 4 p.m. south of Liverpool. No fish sighted this afternoon.
- May 29.—*Arras* 12 miles southeast Little Pope. Increasing northeast winds and misty weather. Unfit for scouting. No mackerel sighted Liverpool to-night.
- May 30.—*Arras* Liverpool coaling ship. Proceed scouting when completed.
- June 1.—The large body of mackerel that is working east along coast is now located five miles south cape LaHave. Fish are from three to ten miles off the coast. Small schools showing on radius of seven miles.
- June 1.—One p.m. five miles southwest Betty's island. No mackerel sighted since last report. American fleet bound to Prospect for shelter.
- June 2.—*Arras* at Halifax. Weather unfit for scouting. Will complete with stores before sailing.
- June 5.—*Arras* position 6 p.m. fifteen miles west from Sambro. No fish sighted to-day. Weather calm and hazy.
- June 6.—*Arras* position 6 p.m. six miles west from Bettys island. Weather conditions light east winds and light fog. No fish sighted.
- June 7.—*Arras* position six p.m. four miles southwest from Beaver island. Small bunches of mackerel showing and going east close along the coast. Ten American seiners in sight. Going east.
- June 6.—Eleven-thirty last night sighted three large schools mackerel five miles south Cross island and moving slowly eastward. The main body of fish are still on west coast being halted in their easterly course by east winds and cold currents which is setting west along coast. American seiners are scattered along coast from LaHave to Sambro.
- June 8.—*Arras* position 4 p.m. three miles southwest from White island. Small bunches of fish going east. Thirteen American seiners holding close to three mile limit and we are in close touch with them.
- June 9.—Anchored at Fort Dufferin with eleven American seiners. Proceeding soon as weather clears.
- June 11.—*Arras* position 8.30 a.m. four miles south Beaver island. No fish sighted. Weather unfit for scouting. All American seiners returning Beaver harbour.
- June 12.—Eleven forty-five a.m. sighted large school mackerel two miles off White islands 12.20 p.m. Sighted small schools mackerel three miles south southwest from White islands. Fish moving very fast east and keeping close to shore. American seiners very active close to three mile limit.
- June 12.—*Arras* position 6 p.m. five miles off Liscombe. No fish sighted since last report.
- June 13.—Two-thirty p.m. sighted two large schools mackerel two and a half miles south from Whitehead light. Fish showing up good and moving east close along coast. Large catches of mackerel in nets off Country harbour. This morning one boat reports 1,600 fish.
- June 13.—*Arras* position 7 p.m. five miles southeast from Whitehead. Large body of mackerel going east towards Cape Breton coast.
- June 14.—Ten a.m. five miles south Canso. Large body of mackerel moving towards Cape Breton coast. Proceeding east towards Cape Breton coast.
- June 17.—*Arras* position 8 p.m. three miles south from Whitehead. No fish sighted to-day. We are cruising towards Cape Breton coast.

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- June 18.—*Arras* position 3 p.m. three miles south from Scattarie, Cape Breton.  
No fish sighted to-day.
- June 19.—*Arras* position 4.30 p.m. four miles southeast from Ingonish. Several small schools mackerel sighted going north.
- June 20.—*Arras* at Magdalen island. Weather conditions unfit for scouting.  
No mackerel sighted to-day.
- June 22.—*Arras* at Souris. Weather unfit for scouting. Proceeding to-morrow morning.
- June 23.—*Arras* at Pictou. Proceeding Monday to south coast, Cape Breton.
- June 25.—*Arras* proceeding Halifax. Arriving to-morrow morning weather permitting.
- June 26.—*Arras* arrived Halifax this morning.

## APPENDIX 5

The following is a statement of the different kinds of licenses issued by the different Inspectors, during the 1923-24 Season:—

## MAGDALEN ISLANDS, QUEBEC—Inspector S. T. GALLANT

Kind of Licenses—	Number of Licenses Issued
Lobster fisherman's licenses.....	772
Lobster packing licenses.....	24
Lobster packing extensions.....	25
Herring trap-net licenses.....	23
Herring seine licenses.....	24
Smelt bag-net licenses.....	4
Receipt books.....	35
	<hr/> 847

## PRINCE EDWARD ISLAND—Inspector S. T. GALLANT

Lobster fisherman's licenses.....	2,399 (1 cancelled)
Lobster packing licenses.....	197
Lobster packing extensions.....	103 (1 cancelled)
Cannery licenses.....	6
Quahaug fishery licenses.....	5
Oyster fishery licenses.....	164
Smelt gill-net licenses.....	307
Smelt bag-net licenses.....	270
Trap-net fishing licenses.....	3
	<hr/> 3,351 (1 cancelled)

## MANITOBA—Inspector J. B. SKAPTASON

Commercial sturgeon fishery licenses.....	183
Domestic sturgeon fishery licenses.....	4
Angling permits for non-residents.....	37
Special fishery licenses.....	2,364 (3 cancelled)
Settler's permits.....	817
Receipt books.....	2,497 (3 cancelled)
	<hr/> 3,405 (3 cancelled)

## SASKATCHEWAN—Inspector G. C. McDONALD

Commercial sturgeon fishery licenses.....	5
Domestic sturgeon fishery licenses.....	9
Commercial and fisherman's licenses.....	582
Domestic fishery licenses.....	80 (1 cancelled)
Indian and Half-breed permits.....	697
Receipt books.....	277
	<hr/> 1,373 (1 cancelled)

## ALBERTA—Inspector R. T. ROND

Special angling permits.....	3,281 (2 cancelled)
Commercial and fisherman's fishery licenses.....	647
Domestic fishery licenses.....	131 (18 cancelled)
Indian and Half-breed permits.....	340
Receipt books.....	301
	<hr/> 4,399 (20 cancelled)

## NOVA SCOTIA—DISTRICT No. 1—Inspector A. G. McLEOD

Kind of licenses— <i>Continued</i>	Number of licenses issued
Lobster fisherman's licenses.....	2,190
Lobster packing licenses.....	55
Lobster packing extensions.....	38
Angling permits.....	28
Fish cannery.....	1
Salmon trap-net, pound-net or weir.....	157
Certificates under Sec. 63.....	50
Special fishery licenses for trap-net fishing.....	38
Salmon gill-net or drift-net licenses.....	28
Herring weir licenses.....	5
Smelt bag-net licenses.....	40
Smelt gill-net licenses.....	222
Oyster fishery licenses.....	91
Receipt books.....	6
	<hr/> 2,855

## NOVA SCOTIA—DISTRICT No. 2—Inspector D. H. SUTHERLAND

Lobster fisherman's licenses.....	3,072 (2 cancelled)
Lobster packing licenses.....	81 (2 cancelled)
Lobster packing extensions.....	52 (1 cancelled)
Angling permits.....	28
Fish cannery.....	5
Salmon trap-net, pound-net or weir.....	120
Certificates under Sec. 63.....	102
Special fishery licenses for trap-net fishing.....	139
Salmon gill-net or drift, net licenses.....	177
Herring weir licenses.....	12
Smelt bag-net licenses.....	212
Smelt gill-net licenses.....	266
Oyster fishery licenses.....	89 (1 cancelled)
Receipt books.....	160 (2 cancelled)
Shad gill-net or drift-net licenses.....	6
Drag-seine licenses.....	181
	<hr/> 4,388 (5 cancelled)

## NOVA SCOTIA—DISTRICT No. 3—Inspector H. H. MARSHALL

Lobster fisherman's licenses.....	3,595
Lobster packing licenses.....	32
Lobster packing extensions.....	21
Angling permits.....	364 (3 cancelled)
Fish cannery.....	7
Salmon trap-net, pound-net or weir.....	53
Certificates under Sec. 63.....	160 (1 destroyed)
Special fishery licenses for trap-net fishing.....	189 (1 cancelled)
Salmon gill-net or drift-net licenses.....	229
Herring weir licenses.....	70 (1 cancelled)
Smelt bag-net licenses.....	22
Smelt gill-net licenses.....	70
Receipt books.....	34
Salmon net permits.....	13
Scallop fishery.....	224 (3 cancelled)
Lobster pound licenses.....	5
Lobster pound certificates.....	107
Lease of Long Beach pond.....	1
	<hr/> 4,873 (8 cancelled)

## NEW BRUNSWICK—DISTRICT No. 1—Inspector J. F. CALDER

Lobster fisherman's licenses.....	653
Fish cannery licenses.....	6
Shad gill-net or drift-net licenses.....	46
Special permit to dig soft-shell or long-neck clams.....	120
Herring weir licenses.....	552
Salmon gill-net or drift-net.....	77
Certificates under Sec. 63.....	5
Lobster pound licenses.....	5
Lobster pound certificates.....	239
Scallop fishery licenses.....	23
Lease of Dark Harbour fishing privileges.....	1
	<hr/> 1,482

<sup>a</sup> Gaspereau and alewife weirs were issued on herring weir licenses.

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## NEW BRUNSWICK—DISTRICT No. 2—Inspector R. CROCKER

Kind of Licenses—Concluded	Number of licenses issued
Lobster fisherman's licenses.....	2,400
Fish cannery licenses.....	1
Shad gill-net or drift-net.....	29
Salmon gill-net or drift-net.....	51
Certificates under Sec. 63.....	154
Lobster pound licenses.....	5 (1 cancelled)
Lobster pound certificates.....	267 (1 cancelled)
Lobster packing licenses.....	183
Lobster packing extensions.....	62
Quahaug fishery licenses.....	149
Gaspereau pound-net or trap-net.....	50
Salmon trap-net, pound-net or weir.....	375
Salmon net permits.....	43
Smelt bag-net licenses.....	4,423
Smelt gill-net licenses.....	162
Bass fishery licenses.....	98
Oyster fishery licenses.....	647
	<hr/> 8,616 (1 cancelled)

## NEW BRUNSWICK—DISTRICT No. 3—Inspector H. E. HARRISON

Shad gill-net or drift-net licenses.....	219
Salmon gill-net or drift-net.....	105
Salmon net permits.....	129
Bass fishery licenses.....	20
Sturgeon fishery licenses.....	11
Smelt gill-net licenses.....	1
	<hr/> 485

## BRITISH COLUMBIA—Inspector J. A. MOTHERWELL

Fish cannery licenses.....	18 (2 cancelled)
Special angling permits.....	5
Salmon trap-net licenses.....	6
Salmon purse seine licenses.....	196 (2 cancelled)
Cod fishery licenses.....	378
Assistant operator of salmon purse or drag seine.....	881 (17 cancelled)
License to assistant in a boat used in operating a salmon gill-net or drift-net.....	1,011 (19 cancelled)
Indian permits.....	153
Salmon trolling licenses.....	1,446 (1 cancelled)
Salmon fishery licenses.....	3,755 (1 cancelled)
License to a captain of a herring seine boat.....	69 (11 cancelled)
Salmon drag-seine licenses.....	31
Grayfish fishery licenses.....	47
License to a person engaged in cold storage or fish packing to buy fresh salmon from fishermen.....	162
Salmon cannery licenses.....	64 (4 cancelled)
Reduction works licenses.....	4
Boat license to buy fresh salmon from fishermen.....	177 (1 cancelled)
License to a captain of a herring seine boat.....	30
Fishery licenses for gill-nets, drift-nets or drag-seine operated in conjunction with power boats.....	286 (1 cancelled)
Herring purse seine licenses.....	41 (1 cancelled)
Herring drag-seine licenses.....	3
Smelt or sardine fishery licenses.....	53 (1 cancelled)
Sturgeon fishery licenses.....	4
Herring or pilchard gill-net or drift-net licenses.....	32
Crab fishery licenses.....	124
Whale factory licenses.....	3
Metal tags.....	1,613
Special seal destruction permits.....	15
Salmon curing licenses.....	49
Herring curing licenses.....	30
	<hr/> 10,687 (61 cancelled)

## YUKON TERRITORY

Special fishery licenses.....	23
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## MODUS VIVENDI LICENSES

Atlantic coast.....	88 (1 cancelled)
Pacific coast.....	212 (1 cancelled)
Total number licenses issued.....	<hr/> 47,084 (102 cancelled)

## APPENDIX NO. 6

LIST of United States Fishing vessels which entered Canadian Ports on the Atlantic Coast during the year ended December 31, 1923

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Arthur James.....	95	19	1	Shelter.....	cwt.
Aviator.....	210	9	4	" for men.....	
Avalon.....	69	21	8	" bait, ice.....	
Angeline C. Nunan.....	58	21	1	" .....	
Aeolus.....	16	9	17	" .....	6 sword-
American.....	63	23	10	" bait, ice.....	fish.
Acushla.....	70	23	7	" repairs.....	
Bay State.....	81	27	15	Repairs, supplies, shelter, bait, ice, dories, crew, trawl, gear.	
Benjamin M. Wallace....	49	19	2	To ship men, shelter.....	
Bethume.....	66	17	1	Shelter.....	
Constellation.....	89	19	2	" .....	
Catherine.....	77	27	8	Ice, bait, shelter.....	
Columbia.....	96	28	3	Dories, crew, shelter.....	
Corinthian.....	97	23	4	Dories, repairs, shelter.....	
Catharine Burke.....	68	19	6	Shelter, water.....	
Commonwealth.....	93	25	4	Dories, discharge one man, repairs, supplies.	
Coat.....	169	21	3	Repairs.....	
Camben.....	97	24	1	Shelter.....	
Cool.....	169	14	1	Shipping men.....	
Dawn.....	79	25	7	Shelter, engine repairs, oil.....	
Elizabeth W. Nunan.....	48	17	2	Shelter.....	
Elizabeth Howard.....	90	22	9	" bait, supplies, sick man, ice..	25
Evelyn & Ruth.....	38	7	2	Shipping fish.....	99
Elizabeth & Ruth.....	38	20	2	Shelter.....	
Ellen T. Marshall.....	75	23	12	" salt, dories, bait.....	
Ethel B. Penny.....	59	19	4	" ship's log.....	
Elk.....	66	19	11	" bait, ice.....	
Edith C. Rose.....	70	23	5	Bait, repairs, shelter, sick man.....	
Elmer E. Gray.....	71	19	5	Shelter, oil, bait, supplies.....	
Elsie G. Silva.....	50	19	1	" .....	
Flora L. Oliver.....	59	27	12	Shelter, exporting fish, bait, license, supplies, dories, ice.	60
F. L. Chelwina.....	56	19	1	Supplies.....	
Frances S. Grueby.....	94	25	3	Shelter, food.....	
Governor Marshall.....	60	23	9	Ice, supplies, bait, shelter.....	
Grand Marshall.....	70	25	13	Bait, ice, dories, sick man, shelter...	
Gertrude de Costa.....	61	19	5	Water, provisions, shelter.....	
Governor Foss.....	88	24	4	Crews, water, shelter.....	
Good Luck.....	55	19	12	Shelter, supplies, water.....	
Harmony.....	66	23	13	Shelter, bait, oil, men, ice.....	
Henry Ford.....	90	25	13	Ice, supplies, shelter, bait, men, food	6
Hazel R. Hines.....	79	21	2	" .....	
Hortense.....	43	19	1	Shelter.....	
Helena.....	40	13	1	Repairs.....	
Helja Silva.....	77	21	4	Shelter.....	
Hesperus.....	79	25	7	Repairs, sick man, shelter, dories, water, ice supplies.	44
Herbert Parker.....	78	23	9	Dories, supplies, bait, oil, shelter....	
Henrietta.....	62	19	2	Shelter.....	
Harvard.....	72	19	4	Gas, shelter, supplies.....	
Hope Leslie.....	19	11	1	Shelter.....	
Imperator.....	79	23	6	Shelter, bait, ice land fish.....	13
Joffre.....	80	25	3	Ice, supplies, land fish, bait.....	50
John J. Fallon.....	60	19	5	Ice, bait, shelter.....	
Judique.....	89	6	1	Shelter.....	
Killarney.....	73	22	10	Shipping men, shelter, repairs.....	
Lucia.....	43	17	7	Shelter.....	
Loon.....	169	21	5	Bunker coal, repairs to engine, shipping men.	
L. A. Dunton.....	94	23	4	Sent sick man home, shelter, water, provisions.	

## SESSIONAL PAPER No. 29

LIST of United States Fishing vessels which entered Canadian Ports on the Atlantic Coast during the year ended December 31, 1923—*Concluded*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed cwt.
Lark.....	121	23	2	Shelter.....	
Laura Goulart.....	73	21	1	".....	
Mary T. Fallon.....	48	19	4	Ice, shelter, repairs.....	
Mayflower.....	113	25	13	Bait, ice, supplies, shelter, bait reports, salt.	
Mary F. Curtis.....	65	21	25	Ice, trawl gear, bait, storing bait, men, shelter, salt, water, oil.	41
Morning Star.....	85	19	10	Shelter, repairs, ice.....	
Mary E. O'Hara.....	49	22	10	".....	
Mildred Robertson.....	73	19	5	Master burned by explosion, bait, land fish, landed sick man, shipped one.	
Medric.....	189	21	2	Repairs.....	111
Nirvana.....	50	12	4	Shelter, shipped a man.....	
New Dawn.....	20	9	4	".....	
Natalie Hammond.....	51	21	4	".....	
Orion.....	39	13	2	Shelter.....	
Oretha F. Spinney.....	87	25	4	Ice, bait, supplies, dories, landed fish, man, transhipped catch.	
Osprey.....	160	23	4	Bunker coal, repairs.....	
Pioneer.....	53	17	3	Water, shelter.....	
Pilgrim.....	63	18	2	Ice, bait, landed man.....	82
Progress.....	78	19	1	Shelter.....	
Phillip P. Mantha.....	43	17	2	".....	
Plover.....	208	21	4	To land sick men.....	
Progress.....	61	23	6	Repairs, shelter, dory, supplies.....	
Pollyana.....	66	19	3	Bait, shelter.....	
Rex.....	75	23	8	Ice, shelter, repairs, supplies, bait...	
Ruth & Margaret.....	77	23	4	Ice, bait, sick man.....	
Ralph Brown.....	67	20	3	Shelter.....	82
Republic.....	48	19	13	Ice, supplies, shelter, landing halibut, bait, dories.	
Ruth.....	49	20	6	Shelter, supplies.....	
Ripple.....	96	20	1	To land sick men.....	
Sunapee.....	18	9	8	Supplies, shelter.....	14
Surf.....	119	16	14	".....	
Swell.....	119	24	6	Shelter.....	
Stilletto.....	91	19	4	".....	
Shianne.....	21	5	1	".....	1
Saturn.....	137	22	1	In for 2 men.....	
Snipe.....	208	19	1	Supplies, crew.....	
Shamrock.....	68	27	1	Shelter.....	
S. A. Denton.....	94	23	1	Bait.....	9
T. M. Nicholson.....	90	17	9	Ice, bait, shelter, salt, men.....	
Thomas S. Gorton.....	92	23	8	Bait, ice, discharging men, shelter..	
Thelma.....	28	12	2	Shelter.....	
Teazer.....	59	22	2	" bait.....	3
Tern.....	208	21	3	Land sick men, ship men.....	
Waltham.....	44	20	2	Shelter.....	
Yankee.....	96	25	3	".....	

15 GEORGE V, A. 1925

LIST of United States Fishing vessels which entered Canadian Ports on the  
Pacific Coast during the year ended December 31, 1923

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Arctic.....	29	6	1	Land fish.....	cwt. 1,020
Adeline.....	6	2	1	".....	280
Anna J.....	22	5	2	" bait and ice.....	2,360
Alaska.....	44	15	1	".....	4,100
Augusta.....	19	4	1	".....	780
Arcade.....	14	5	13	" bait, ice.....	80
Atlas.....	31	7	1	".....	1,040
Atlantic.....	25	11	2	".....	2,280
Albatros.....	40	13	6	" bait, ice.....	1,200
Alter.....	43	15	1	".....	7,560
Arctic.....	37	6	1	".....	320
Aberdeen.....	29	5	1	Shelter.....	
Alki.....	4	2	1	Land fish.....	20
Arctic.....	4	3	1	Broken machinery.....	
Alfa.....	4	3	1	".....	
America.....	25	11	10	Land fish, bait, ice.....	800
A. 125.....	2	1	1	Ice and bait.....	
Actor.....	7	1	2	".....	
Antler.....	22	5	5	" land fish.....	660
Aurora.....	16	5	16	Supplies, bait and ice.....	
Alice.....	21	3	1	Bait.....	
Alfa.....	12	5	7	" ice.....	
Agnes.....	17	5	6	Bait and ice.....	
Alice B.....	13	5	11	" land fish.....	220
Active.....	4	2	1	".....	
Alf.....	4	1	2	".....	
Baltic.....	20	4	1	Land fish.....	740
Brothers.....	13	5	1	".....	1,260
Bravo.....	10	3	1	".....	1,040
Bringold.....	12	5	1	".....	880
Bolinder.....	5	1	2	Supplies, bait.....	
Beaver.....	17	5	13	Bait and ice.....	
Bonnie Lass.....	2	2	1	Supplies.....	
Commonwealth.....	60	17	2	Land fish, ice and bait.....	2,100
Constitution.....	57	9	1	".....	3,080
Carolyn.....	18	3	1	".....	600
Corona.....	19	11	8	" bait and ice.....	680
Confidence.....	22	3	1	Supplies.....	
California.....	20	5	5	Land fish, bait, ice.....	720
Chimera.....	9	3	7	".....	380
Chancellor.....	13	5	6	".....	840
Crescent.....	8	4	2	" ice and bait.....	1,200
Cape Clear.....	13	4	8	".....	360
Corsair.....	4	3	1	Shelter.....	
Cora.....	4	3	1	Land fish.....	220
Circle H.....	4	1	1	Supplies.....	
Cora.....	9	5	1	".....	
Carlisle.....	10	2	1	Land fish.....	200
Cedric.....	19	4	1	".....	200
Chatham.....	24	5	1	Ice and bait.....	
Christina.....	4	1	5	Supplies, land fish, unknown.....	24
Ceta H.280 H.....	4	1	1	Supplies.....	
125 C. A.....	2	1	1	".....	
Clarion.....	15	4	1	Bait and ice.....	
Dora H.....	15	5	5	".....	
Defence.....	20	5	1	Land fish.....	1,680
Don Carlos.....	8	3	1	".....	120
Discovery.....	10	4	1	".....	520
Daily.....	26	6	1	".....	2,220
Democrat.....	27	6	1	".....	1,700
Director.....	14	5	2	".....	260
Doll.....	4	1	1	Supplies.....	
Dependent.....	4	3	1	Land fish.....	80
Dreamer.....	25	2	1	Shelter.....	
Evolution.....	17	5	10	Land fish, ice and bait, engine trouble.....	240
Eidsvold.....	15	5	11	Land fish, bait, for orders, fresh water.....	1,000

## SESSIONAL PAPER No. 29

LIST of United States Fishing vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1923—*Continued*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
					cwt.
Eastern Point.....	4	3	1	Land fish.....	600
E. Neilson.....	15	4	6	" ice and bait.....	500
Eagle.....	9	3	2	" .....	780
Eureka.....	4	2	1	" .....	40
Emla.....	4	2	1	" .....	40
Emblem.....	4	2	1	" .....	100
Eagle.....	67	17	1	" .....	1,660
Emma.....	17	2	1	Ice and bait.....	
Enterprise.....	8	3	10	Bait and ice.....	
Erin.....	28	4	1	" .....	
Eleanora.....	16	5	6	" .....	
Famous.....	9	3	1	Engine trouble.....	
Forward.....	18	5	4	Land fish, ice and bait.....	1,860
Fairway.....	19	5	5	" .....	1,480
Fremont.....	10	4	8	" .....	260
Fortuna.....	21	5	12	" for orders.....	60
Flower.....	3	2	1	" .....	20
Faith.....	7	3	10	" bait and ice.....	60
Fram.....	4	3	1	" .....	100
Flattery.....	10	3	1	" .....	60
Ford.....	4	3	1	" .....	140
Flora.....	4	3	2	" bait and ice.....	140
Flamingo.....	13	5	6	Bait and ice.....	
F. C. Hergert.....	15	5	8	" .....	
Gladstone.....	23	6	1	Land fish.....	1,960
Gony.....	12	5	3	" bait and ice, stores.....	280
Get the Hook.....	10	1	1	" .....	20
Glacier.....	12	4	1	" .....	760
Grayling.....	16	5	1	" .....	620
Groth.....	7	3	1	" .....	360
Grechen.....	7	3	2	" .....	240
Good-Will.....	4	4	1	Supplies.....	
Gold Fish.....	4	2	1	Land fish.....	20
Genevieve.....	4	2	1	" .....	40
G. A. 883.....	3	1	2	Ice and bait, supplies.....	
Grant.....	5	2	1	Land fish.....	160
G. A. 473.....	4	2	1	Supplies.....	
Helgeland.....	56	15	1	Land fish.....	7,380
Harding.....	19	5	5	" ice and bait.....	1,060
Happy.....	12	4	2	" .....	760
Hilda.....	10	3	2	" .....	11,960
Hazel.....	7	3	2	" .....	360
Hazel H.....	24	5	7	" bait and ice.....	1,440
Hazel L.....	9	3	2	Shelter, ice and bait.....	
Hi Gill.....	11	4	3	Land fish, bait, engine trouble.....	1,120
Hilda.....	16	3	1	" .....	100
Hanna.....	11	8	4	Shelter, ice and bait.....	
Harvestor.....	15	5	2	Land fish, bait and ice.....	100
Hiawatha.....	3	3	1	Shelter.....	
Hurget.....	15	5	1	Ice and bait.....	
Imperial.....	35	5	1	Land fish.....	1,240
Ictus.....	3	3	1	Shelter.....	
Inverness.....	16	2	1	" .....	
Jennie F. Decker.....	16	8	15	Bait and ice.....	
Judith.....	5	3	8	" land fish.....	8
June.....	15	5	1	Land fish.....	900
J. P. Todd I.....	4	2	1	" .....	140
J. P. Todd II.....	12	5	1	" .....	200
Jennie.....	10	5	1	" .....	40
Jeanette.....	6	1	1	" .....	40
Kennebec.....	3	3	1	" .....	100
Kodiak.....	38	13	6	Engine trouble, land fish, ice and bait.....	2,280
Kanatak.....	38	7	1	Land fish.....	840
K. 377.....	4	2	1	" .....	60
Katella.....	16	6	17	Stores, bait.....	
LaPaloma.....	14	11	9	Land fish, ice and bait.....	160
Lenor.....	14	4	1	" .....	480
Lancing.....	20	4	1	" .....	820

15 GEORGE V, A. 1925

LIST of United States Fishing vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1923—Continued

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Lebanon.....	14	5	10	" ice and bait, water and towing Tillicum.	cwt. 100
Lunmen.....	10	4	1	"	880
Lincoln.....	23	6	5	" ice and bait.....	2,060
Lituya.....	30	11	2	" "	1,480
Lincoln.....	4	2	1	"	280
Liberty.....	17	7	1	"	640
Lief II.....	21	3	1	"	360
Liberty.....	4	1	1	Ice and bait.....	
Lite H. 280.....	4	1	1	"	
Louis.....	4	2	1	Land fish.....	60
Lervis II.....	8	3	1	Ice and bait.....	
Leona.....	3	1	1	Supplies.....	
775 L.....	3	3	1	"	
681 L.....	2	4	1	"	
972 L.....	5	1	1	"	
Laurel M.....	5	3	1	Water.....	
Lincoln.....	9	5	1	"	
Louise.....	16	6	17	Bait and ice.....	
Laura.....	7	3	5	"	
Liberty.....	44	16	4	"	
Mermaid.....	19	5	7	Land fish, bait and ice.....	460
Mildred 13.....	19	5	12	" bait.....	380
Mars.....	9	4	2	" water.....	420
Mira.....	7	3	1	"	640
Mildred II.....	31	6	3	" bait and ice.....	1,520
Marie M.....	5	2	3	"	102
Magnolia.....	25	4	1	"	240
Madeline J.....	21	5	10	" ice and bait.....	140
Majestic.....	33	7	1	"	2,800
Mary G.....	4	2	3	Supplies, ice and bait, water.....	
Muzon.....	19	4	1	Ice and bait.....	
M. & K.....	4	2	3	Land fish, bait and ice.....	10
Mary.....	16	8	11	Bait, ice.....	
Myrtle.....	9	4	15	"	
Myron.....	2	2	1	Supplies.....	
M. 935.....	5	5	1	"	
M. 147.....	4	5	1	"	
Mary.....	11	8	1	Bait and ice.....	
Myrtle.....	19	3	1	"	
Nomad.....	15	5	10	Land fish, for orders, engine trouble, bait, ice.	450
National.....	20	6	8	Land fish, ice and bait.....	1,480
Norland.....	19	6	1	"	420
North.....	9	5	9	" bait and ice.....	200
Norma.....	9	3	1	"	880
Norma.....	6	3	1	"	60
Neptune.....	6	3	1	"	140
Nesmar.....	2	2	1	"	20
NeLu.....	4	2	1	"	40
North Light.....	13	3	2	Shelter, water.....	
New England.....	70	28	1	Land fish.....	1,540
Nelson.....	15	4	1	Ice and bait.....	
Ouah.....	18	5	6	Land fish, ice and bait.....	640
Omancy.....	34	12	3	" for orders, bait and ice...	3,400
Orient.....	48	15	4	" bait and ice.....	301
Pelican.....	17	4	4	" ice and bait.....	900
Pioneer.....	48	15	1	"	5,680
Presho.....	14	5	4	" bait and ice.....	440
Pioneer III.....	26	5	9	"	1,500
President.....	24	6	6	"	1,240
Panama.....	34	13	3	" ice and bait.....	3,800
Pirate.....	20	3	1	"	200
Polaris.....	45	15	2	" bait and ice.....	2,560
Petrel.....	67	7	1	Land sick man.....	
Pearl F.....	7	2	1	Ice and bait.....	
Primrose.....	4	1	3	Land fish, bait and ice.....	15
Pershing.....	18	5	12	Bait, ice.....	

## SESSIONAL PAPER No. 29

LIST of United States Fishing vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1923—*Continued*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Prosperity.....	25	6	4	"	cwt.
Republic.....	51	14	1	Land fish.....	8,040
Reliance.....	11	5	5	" for orders.....	1,240
Reliance No. 1.....	19	5	2	" ice and bait.....	1,980
Reliance.....	14	4	1	"	420
Reliance.....	8	3	1	"	880
Rolfe.....	10	5	1	"	1,380
Restitution.....	24	5	9	" ice and bait, supplies.....	1,100
Roald Amunsden.....	16	6	1	"	1,800
Rosario.....	16	5	8	" bait and ice.....	180
Rambler.....	10	3	2	" supplies.....	60
Rival.....	4	3	1	"	80
Raven.....	4	2	1	"	300
Reform.....	4	3	1	"	240
Royal.....	15	5	6	" ice and bait.....	540
Ramier.....	4	3	1	"	360
Radio.....	63	16	1	"	3,620
Ruth M.....	5	1	2	Supplies.....	
Rolfe.....	4	1	1	Land fish.....	8
Roosevelt.....	13	5	11	Bait.....	
Sunset.....	37	8	1	Land fish.....	340
Seymour.....	44	16	2	" bait and ice.....	1,020
Sunland.....	26	4	1	Land fish.....	400
Success.....	4	3	1	"	520
Sirius.....	17	4	1	"	360
Senator.....	11	6	1	"	2,320
Sitka.....	50	15	1	"	3,260
Summer.....	34	13	1	"	3,280
Secla.....	18	2	1	Shelter.....	
Seattle.....	55	15	3	Land fish, ice and bait.....	2,800
Scandia.....	76	17	1	"	5,080
Sadie K.....	13	5	6	" ice and bait, engine trouble.....	880
Sherman.....	18	5	1	"	2,060
Samson.....	7	3	1	"	180
Star.....	12	4	1	"	920
Scout.....	4	2	1	"	260
Star.....	7	4	3	" ice and bait.....	180
Sentinel.....	21	6	1	"	1,360
Snowir.....	8	2	1	"	80
S. & S.....	4	3	1	"	180
Sea Lion.....	6	2	5	" unknown, bait and ice.....	25
Sammy.....	8	3	15	Bait and ice.....	
S.F. 680 L.....	3	2	1	Supplies.....	
Solo.....	2	2	1	"	
Spencer.....	17	5	6	Bait, engine trouble.....	
Superior.....	16	5	12	Bait and ice.....	
Swift.....	7	2	3	"	
Siloam.....	16	5	2	"	
Tom Boy.....	5	4	1	Shelter.....	
Tyce.....	12	4	1	Land fish.....	1,120
Tom & Al.....	57	15	1	"	5,360
Tahoma.....	18	6	2	" ice and bait.....	2,560
Tordenskjold.....	57	13	1	"	4,140
Texas.....	16	5	4	" bait and ice.....	200
Thelma.....	32	5	5	" ice and bait.....	460
Tatoosh.....	21	6	1	"	1,960
Tillikum.....	21	5	13	" unknown, engine trouble.....	740
Trio.....	19	5	3	Water.....	
Teddy, J.....	13	4	1	Land fish, ice and bait.....	260
T. 965.....	4	1	1	"	1,320
Tarembo.....	12	2	4	"	40
Uranus.....	15	6	3	" bait.....	120
Unimak.....	10	3	1	" ice and bait.....	1,440
Ure.....	5	1	1	"	520
Vivian.....	9	3	1	Water.....	
Vansee.....	43	10	1	Land fish.....	580
Valorous.....	21	4	1	"	6,100
					1,720

15 GEORGE V, A. 1925

LIST of United States Fishing vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1923—*Concluded*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for Entry	Quantity of fish landed
Virginian.....	33	5	1	"	cwt. 1,940
Volid.....	8	3	11	" bait and ice.....	120
Venus.....	4	3	1	"	1,320
Viking.....	11	4	1	"	720
Vesta.....	13	5	1	"	900
Venus.....	25	7	1	"	2,260
Volunteer.....	21	5	10	" bait, for orders, ice.....	160
Viscara.....	33	5	1	Repairs.....	
Velva.....	6	2	1	Bait, ice.....	
Velero.....	6	3	11	Bait and ice.....	
Volunteer.....	19	5	8	"	
Virginis.....	5	2	2	" land fish.....	6
Westfjord.....	17	5	6	Land fish, bait, ice.....	360
Woodrow.....	23	5	6	" ice and bait.....	450
Wabash.....	6	3	1	"	1,020
Wilson.....	19	5	5	" ice and bait.....	100
Wireless.....	19	6	5	"	900
Wave.....	7	3	1	"	580
Washington.....	13	4	1	"	760
White Star.....	17	4	2	"	420
Wyague.....	4	3	1	Ice and bait.....	
Wilhelmina.....	17	5	14	Supplies, bait and ice.....	
Xaporta.....	187	36	1	Land fish.....	400
Yakutat.....	41	13	6	" bait and ice.....	2,380
Yellowstone.....	22	5	1	"	1,180

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DOMINION OF CANADA

FIFTY-EIGHTH

ANNUAL REPORT

OF THE

# FISHERIES BRANCH

Department of Marine and Fisheries

FOR THE YEAR

1924-25

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DOMINION OF CANADA

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FOR THE YEAR

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OTTAWA

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1925



To General His Excellency the Right Honourable Lord Byng of Vimy, G.C.B.,  
G.C.M.G., M.V.O., Governor General and Commander in Chief of the  
Dominion of Canada.

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of your Excellency  
and the Parliament of Canada, the Fifty-eighth Annual Report of the Fisheries  
Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

P. J. A. CARDIN,

Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,  
OTTAWA, August, 1925.

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## DEPUTY MINISTER'S REPORT

To the Hon. P. J. A. CARDIN,  
Minister of Marine and Fisheries.

SIR,—I have the honour to submit the Fifty-eight Annual Report of the Fisheries Branch of the Department, which is for the fiscal year ended March 31, 1925.

The report deals with the following subjects:—

- Review of the Fisheries of 1924.
- Operation of the Fish Inspection Act.
- The Inspection of Canneries and Canned Foods.
- Fisheries Intelligence Service.
- Fish Publicity Campaign.
- Fishing Bounty.
- Fish Culture.
- North American Committee on Fish Investigations.
- Work of the Biological Stations.
- Technical Classes for Fishery Officers.
- Natural History Observations.

Appendices to the report include the following:—

- Reports of Inspectors of Fisheries.
- Fisheries Expenditure and Revenue.
- Fishways and Removal of Obstructions.
- Summary of Licenses issued.
- Entries of United States Fishing Vessels.

### REVIEW OF THE FISHERIES OF 1924

There was a somewhat greater production of fish on both the Atlantic and Pacific coasts during 1924, while in the inland parts the catch was slightly above that of the previous year. The value of the total catch when marketed, however, shows a very substantial increase of almost \$2,000,000.

The marketed value of the fisheries of each province is shown in the following table, together with the value for the preceding year.

	1924	1923
Nova Scotia.....	\$ 8,777,251	\$ 8,448,385
New Brunswick.....	5,383,286	4,548,535
Prince Edward Island.....	1,201,772	1,754,980
Quebec.....	2,233,314	2,100,412
Ontario.....	3,557,587	3,159,427
Manitoba.....	1,232,563	1,020,595
Saskatchewan.....	482,492	286,643
Alberta.....	339,107	438,737
British Columbia.....	21,257,567	20,795,914
Yukon Territory.....	18,773	11,917
	<hr/>	<hr/>
	\$ 44,534,235	\$ 42,565,545

It will be seen from this statement that only two provinces show a decrease in the value of their fisheries, viz., Prince Edward Island and Alberta. In the case of Prince Edward Island, the decrease is due to the poor catch in the lobster fishery, while the statistics for Peter Pond Lake, which formerly were shown in Alberta, are this year included in Saskatchewan instead of Alberta, which practically makes up for the decrease in the latter province.

#### ATLANTIC FISHERIES

*Cod, Haddock, Hake and Pollock.*—2,433,234 cwts. of these fish were taken compared with 2,241,799 cwts. in the preceding year, or an increase of 191,435 cwts. The catch of each kind shows an increase in Nova Scotia. The Lunenburg fishing fleet was slightly larger than in the year previous and had a very successful season, making larger catches and obtaining better prices than in the previous year. In New Brunswick there was a decrease in the catch of cod and pollock. Cod and hake were landed in larger quantities in Prince Edward Island and the catch of cod increased in Quebec.

It is interesting to note that the quantity of these kinds marketed in a fresh condition rose from 247,737 cwts. in 1923 to 331,421 cwts.

*Mackerel, Herring and Sardines.*—The total catch of these three kinds was 1,600,179 cwts., which is an increase of 496,543 cwts. There were 844,461 cwts. of herring taken, or an increase of 151,696 cwts. The provinces of Quebec and Prince Edward Island show a decrease in the fishery, while the New Brunswick and Nova Scotia catches were much larger, the latter provinces showing an increase of 101,527 cwts. More of these fish were smoked by the fishermen, who received more for them on this account than by selling the herring fresh. A good increase is noted in the quantity of pickled herring put up in Nova Scotia.

There were 215,590 cwts. of mackerel landed, which is an increase of 73,841 cwts. over that of the year previous. These fish were quite plentiful and for the first time in many years remained around the shores of Prince Edward Island all summer. Greater quantities could have been taken by the New Brunswick fishermen, but the latter did not prosecute the fishery diligently, remembering the poor price paid in the previous year when there was a glut in the American market.

Some 270,064 barrels of sardines were taken. This is an increase of 135,503 barrels over the 1923 catch, when 134,561 barrels were taken. As a result of the sudden drop in price from \$12 per hogshead to \$6 soon after the opening of the canning season, it was realized that something must be done to protect the fishery. The department inserted in each weir license, at the request of the weir owners, a condition that sardines for export could not be sold for less than \$10 per hogshead. This condition was at first vigorously opposed by the United States canners, who buy the bulk of the fish, but the latter have changed their opinion on finding that the canning business has been stabilized thereby. A canner can now put up goods when the market is dull, knowing that his competitor is not obtaining the raw material at a cheaper price.

*Other Sea Fish.*—There were 28,265 cwts. of halibut taken, compared with 19,658 in 1923. Of this quantity Nova Scotia produced 27,407 cwts. The catch of swordfish was considerably less, only 5,575 cwts. being taken, against 14,343 the previous year. These fish were exceptionally scarce except off the Sydney Harbour fishing grounds. Those fishermen operating at the latter place had a banner year. The catch of tom cod shows a large increase, while there were fewer flounders and albacore taken, the latter showing a reduction of fifty per cent in the catch.

**Shellfish.**—The lobster fishing was not a success. This was due primarily to a scarcity of fish and also to the large carry over of the pack of 1923, when prices were low and canned lobsters could not be disposed of. One result, however, was that a greater part of the catch was shipped fresh and the carry over of the previous year's pack was disposed of.

The catch was 272,713 cwts., or a decrease of 108,915 cwts. from the previous year.

The catch and its disposal by provinces was as follows:—

	Catch	Catch marketed	
		In shell, cwts.	Canned cases.
Nova Scotia.....	115,275	34,550	40,831
New Brunswick.....	68,303	26,024	23,548
Prince Edward Island.....	65,893	6,650	26,814
Quebec.....	22,742	1,025	10,925

The pack in Nova Scotia shows a decrease of some 23,000 cases; New Brunswick, 3,000 cases; Prince Edward Island, 17,000 cases; and Quebec, 6,000 cases.

There were 27,319 barrels of oysters taken compared with 21,374 barrels in 1923.

The quantity of clams and quahaugs dug was 40,327 barrels, which is an increase of 10,753 barrels, while scallops show a decrease of 3,540 barrels with a catch of 10,350 barrels.

**River Spawning Fish.**—There were 57,561 cwts. of salmon caught, which is an increase of 12,740 cwts. New Brunswick shows an increase of 12,700 cwts. over the previous year.

An increase of 25,634 cwts. is shown in the catch of smelts, some 88,926 cwts. being taken. New Brunswick shows an increase of 20,765 cwts. and Prince Edward Island, 4,489 cwts.

Alewives show a big drop in the catch, only 31,401 cwts. being caught, a decrease of 20,423. The markets for salted alewives were very poor during the year.

#### INLAND FISHERIES

There was an increase in the catch of whitefish of 9,918 cwts., with a total landing of 167,706 cwts.

The quantity of pickerel taken was 101,610 cwts., which is a decrease of 3,485 cwts. 30,601 cwts. of blue pickerel were landed in Ontario, which is a decrease of 2,259 cwts.

The catch of herring in Ontario was 125,013 cwts., or an increase of 16,501 cwts.

The catch in the St. John River district of New Brunswick was somewhat greater.

#### PACIFIC FISHERIES

**Salmon.**—The year under review was an exceptionally good one in the salmon fishing industry. The catch was 1,965,159 cwts. and the pack amounted to 1,747,505 cases, which is the largest on record.

Of the pack that of pinks was the largest with 657,561 cases, chums second with 570,497 cases, and sockeye third with 369,601 cases. The pack of the two former varieties constitutes a record in each instance, while that of sockeye is the largest since 1915.

*Halibut*.—The catch of this species amounted to 331,382 cwts., or the second largest catch on record, that of 1923 being 334,367 cwts. It should be noted, however, that the closed season, under the International Halibut Treaty, for fishing commenced on November 15. Practically everyone interested in the conservation of the supply of halibut is expressing gratification at the establishment of the closed season for halibut fishing, which extends for three months. It is to be hoped that this closed season will have the desired effect of aiding in restoring the halibut fishery from its present depleted condition.

*Herring*.—An increased catch is reported, there being 1,157,625 cwts. taken, compared with 1,035,823 cwts. in 1923. The pack of dry salted shows a substantial increase, 853,543 cwts. being so cured. In 1923 the quantity was 744,036.

*Pilchards*.—There were 27,485 cwts. of these fish taken, compared with 19,492 cwts. in the previous year. Owing to the poor market for the canned product the pack was somewhat less.

*Whales and Seals*.—Three whaling stations were in operation during the year, two at the Queen Charlotte islands and one on the west coast of Vancouver Island. The catch was 415 compared with 455 in 1923. Of the catch 125 were fin and 100 sei.

There were 2,232 fur seals taken under the provisions of the Pelagic Sealing Treaty, by the Indians on the Pacific coast, compared with 4,424 in 1923.

#### INSPECTION OF FISH

Under authority of the Fish Inspection Act, the inspection of certain kinds of fish and the packages in which they are marketed, was carried on throughout the season of 1924. The inspection work was performed by a staff of three permanent and nine temporary inspectors on the Atlantic coast and three temporary inspectors on the Pacific coast.

The chief purposes of the Act are to require that all fish which come under its provisions shall be fit for human food, that such fish shall be packed in water-tight barrels of a standard size, that the barrels shall contain the proper weight of fish and that the fish shall be as represented by the marks placed on the barrels by the packer.

In order that the inspecting officers might more effectively deal with the inspection and sale of standard barrels, authority was obtained in 1923 to allow them to inspect all barrels intended for the use of such fish as come under the provisions of the Act at the coopers' shops. The officers acted under this authority in 1924 for the first time and the results have been gratifying both to the department and the trade. Two or three years ago, it was a somewhat difficult matter to persuade fishermen and packers generally, that their submission to the provisions of the Fish Inspection Act would result in material benefits to them. By administering the Act in a judicious and tactful way, however, the goodwill and co-operation of the trade has been secured to such an extent that to-day buyers of both barrels and fish insist on official inspection.

The following quantities were inspected during 1924:—

On the Atlantic coast, sixty thousand, nine hundred barrels of herring, mackerel and gaspereau, almost fifty thousand empty barrels, and fifty thousand boxes of smoked herring.

On the Pacific coast there were inspected two hundred and twenty thousand boxes of dry salted herring, each containing four hundred pounds.

#### INSPECTION OF CANNERIES AND CANNED FISH

The inspection of fish canneries of all kinds throughout Canada, the raw material to be used therein, the whole process of canning, the canned product and the labelling and marking of the cans was carried on under the provisions

of the Meat and Canned Foods Act. This inspection is conducted by the department's staff of fishery overseers as part of their regular duties. This inspection has for its objects:—

1. The extension of trade by improving the quality of the product.
2. The protection of the public by preventing the packing of unsound fish and insisting on the correct labelling of cans of fish.

There are between six hundred and seven hundred canneries, large and small, canning fish of various kinds on the Atlantic and Pacific coasts. Many of these canneries are small and operated by individuals without much capital. It has not been an easy task, therefore, to bring such into line with all the requirements of the Act. Notwithstanding this, however, a very marked improvement has been brought about in the last three or four years, especially by the operation of this Act, not only in the conditions under which canning operations are carried on from a sanitary point of view, but in the quality of the canned product as well. Defects in buildings and equipment, especially in lobster canneries, are being constantly remedied and improvements effected at the instigation of the inspecting officers.

#### FISHERIES INTELLIGENCE SERVICE

Under this service there was carried on during the season of 1924:—

1. The collection of monthly statistics of the sea fisheries, and the compilation of such in a summarized form for publication through the press each month.

2. The publication of a quarterly bulletin containing the statistics in detail. The bulletin is distributed to the trade and all directly concerned. The statistics are practically all collected by the regular fishery officers while performing their other duties as such and at very little additional cost.

3. The collection of information concerning supplies of bait day by day along certain stretches of the coast during the spring and summer months. The information is gathered by the officers of the department, who send it by telegram daily to certain ports where it is posted up for the information of Masters of fishing vessels and those looking for bait.

#### FISH PUBLICITY CAMPAIGN

During part of the year 1924, the advertising campaign for the purpose of increasing the consumption of fish was continued. The campaign was conducted by a committee of the Canadian Fisheries Association with the assistance of the department. It is evident from the information before the department that as a result of this work the consumption of fish throughout Canada has increased very perceptibly.

#### FISHING BOUNTY

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the Maritime Provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1924, payment was made on the following basis:—

To owners of vessels entitled to receive bounty—\$1 per registered ton, payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty—\$8.30 each.

To owners of boats measuring not less than 13 feet keel—\$1 per boat.

To boat fishermen entitled to receive bounty—\$6.65 each.

There were 10,104 bounty claims paid. In the preceding year there were 8,915 bounty claims paid.

The total amount paid was \$159,826.40 allocated as follows:—

To 533 vessels and their crew . . . . . \$ 40,399 30

To 9,571 boats and their crew . . . . . 119,427 10

## FISHING BOUNTY EXPENDITURE FOR 1924-25

County	Boats	Men	Amount	Vessels	Tons	Av. Tons	Men	Amount	Paid
<i>Nova Scotia</i>			\$ cts.					\$ cts.	
Annapolis.....	165	266	1,933 90	1	60	60	15	184 50	166
Antigonish.....	138	209	1,531 65						138
Cape Breton.....	282	492	3,556 65	25	355	14	77	995 50	307
Cumberland.....	3	4	29 60						3
Digby.....	348	590	4,271 50	4	137	34	40	469 00	352
Guysboro.....	578	934	6,792 90	37	632	17	166	2,009 80	615
Halifax.....	1,062	1,415	10,476 50	63	892	14	263	3,074 90	1,125
Inverness.....	293	641	4,576 55	10	140	14	48	538 40	303
Kings.....	38	51	377 15						38
Lunenburg.....	502	619	4,621 20	114	5,667	50	1,434	17,571 30	616
Pictou.....	35	51	374 15						35
Queens.....	144	229	1,666 85	13	183	14	57	656 10	157
Richmond.....	362	633	4,573 35	20	350	17	90	1,097 00	382
Shelburne.....	498	868	6,274 95	18	439	24	147	1,659 10	516
Victoria.....	271	414	3,035 50	8	123	15	30	372 00	279
Yarmouth.....	134	299	2,123 30	9	436	48	123	1,456 90	143
Total.....	4,853	7,715	56,215 70	322	9,414	29	2,490	30,084 50	5,175
<i>New Brunswick</i>									
Charlotte.....	192	351	2,525 10	2	40	20	17	181 10	194
Gloucester.....	334	414	3,090 20	183	2,774	15	775	9,212 80	517
Kent.....	12	27	191 55	6	63	6	13	170 90	18
Northumberland									
Restigouche.....	3	6	42 90						3
St. John.....	20	30	219 50						20
Total.....	561	828	6,069 25	191	2,877	15	805	9,564 80	752
<i>Prince Edward Island</i>									
Kings.....	322	470	3,510 20	3	42	14	6	91 80	325
Prince.....	433	821	5,971 15	2	24	12	6	73 80	435
Queens.....	110	239	1,706 00	2	24	12	4	57 20	112
Total.....	865	1,530	11,187 35	7	90	13	16	222 80	872
<i>Quebec</i>									
Bonaventure.....	461	896	6,487 80	3	33	11	8	99 40	464
Gaspé.....	2,159	4,308	30,903 05	10	129	12	36	427 80	2,169
Matane.....	93	144	1,050 55						93
Saguenay.....	579	1,038	7,513 40						579
Total.....	3,292	6,386	45,954 80	13	162	12	44	527 20	3,305
Grand total....	9,571	16,459	119,427 10	533	12,543	24	3,355	40,399 30	10,104

## FISH CULTURE

The fish cultural operations of this department, since their inception, have been mainly in the interests of the commercial food fisheries, but in recent years game fish have received more attention to meet the greater inroads made upon them owing to the improvements of the roads and highways, the more general use of the automobile and the consequent bringing of what were previously remote districts into the reach of the general public. The distribution of speckled trout in the Maritime Provinces was during 1924 larger than in any previous year.

For the first time sturgeon, smelt and carp were propagated in small numbers. Details regarding this work are to be found in the report of the Superintendent of Fish Culture.

An apparatus of great value, whereby the determination of the dissolved oxygen content of hatchery waters is reduced to a purely mechanical operation, was perfected by the Dominion Chemist. The United States Bureau of Fisheries very generously supplied four sets of the equipment that it uses for this work, but this equipment was not found to give as accurate results as could be desired in some of our highly coloured waters. The Dominion Chemist very kindly took the matter under his consideration and perfected the apparatus above mentioned that meets these conditions.

The Canadian National, Canadian Pacific, the Dominion Atlantic and the Esquimalt and Nanaimo railways have very generously undertaken to provide free transportation for all shipments of fish eggs and fish with the attendants accompanying same. The saving effected thereby is of great importance and will leave considerable funds available to increase and expand the hatchery operations.

At the present time the department is operating thirty-two main hatcheries, seven subsidiary hatcheries, four salmon retaining ponds, and one eyeing station. The output from these establishments during 1924 was nearly nine hundred million, as shown by species in the following statement:—

STATEMENT, BY SPECIES, OF THE FISH AND FISH EGGS DISTRIBUTED DURING  
THE YEAR ENDED DECEMBER 31, 1924

Species	Eyed eggs	Fry	Advanced fry	Fingerlings	Yearlings and older fish	Total distribution
<i>Salmo salar</i> —Atlantic salmon.....	100,000	10,768,927	1,139,575	4,238,078	437	16,247,017
<i>Salmo trutta</i> —Rainbow trout.....	79,100			163,014		242,114
<i>Salmo clarki</i> —Cutthroat trout.....	50,000	239,077	70,000	424,348		783,425
<i>Salmo gairdneri</i> —Steelhead salmon.....	2,000	17,329		1,930		21,259
<i>Salmo gairdneri</i> —Kamloops trout.....	738,427	75,000				813,427
<i>Salmo trutta leucomaenis</i> —loch leven trout.....		25,000	50,000	291,963		366,963
<i>Oncorhynchus nerka</i> —Sockeye salmon.....	25,702,500	41,081,047	8,919,495	7,299,303	7,030	83,009,375
<i>Oncorhynchus tshawytscha</i> —Spring salmon.....		60,000		590,466		650,466
<i>Oncorhynchus kisutch</i> —Kennerly's salmon.....	37,800					37,800
<i>Oncorhynchus kisutch</i> —Coho salmon.....	246,000	1,553,186				1,799,186
<i>Oncorhynchus gorbuscha</i> —Pink salmon.....		135,000				135,000
<i>Oncorhynchus keta</i> —Chum salmon.....				2,166		2,166
<i>Salvelinus fontinalis</i> —Speckled trout.....	290,000	1,125,221	343,000	1,223,016	153	2,981,390
<i>Coregonus clupeaformis</i> —Whitefish.....		587,517,050				587,517,050
<i>Cristiomer namaycush</i> —Salmon trout.....	20,000	21,273,633	3,600,000	999,943		25,893,576
<i>Argyrosomus arcti</i> —Cisco.....		6,388,000				6,388,000
<i>Stizostedion vitreum</i> —Pickerel.....		160,625,000				160,625,000
<i>Micropterus dolomieu</i> —Black bass.....				1,037		1,037
<i>Cyprinus carpio</i> —carp.....		4,999,200				4,999,200
<i>Acipenser rubicundus</i> —sturgeon.....		8,000				8,000
	27,265,827	835,890,670	14,122,070	15,235,264	7,620	892,521,451

## NORTH AMERICAN COMMITTEE ON FISHERIES INVESTIGATIONS

This committee, on which are represented, in addition to Canada, the United States, Newfoundland, and France, held two meetings during the year 1924, the first in May and the second in November. Information was interchanged and common plans formulated so that the various investigations in international waters might be co-ordinated toward a common goal. These plans involved a number of separate investigations. The general study of conditions in the sea has been in two directions. In the first place arrangements have been made for the regular taking of ocean temperatures at definite points. In this way a selected series of data will be available for the water, somewhat comparable to those that have been for so many years obtained for the air. The importance of the temperatures for the fisheries is very great, as they not only to a considerable extent determine where the various fishes are to be found at any given time, but also frequently determine success or failure in breeding according as they are suitable or unsuitable for the helpless eggs and fry. The circulation of the waters along the coast and in the vicinity of the off-shore fishing banks has been under investigation for several years with very striking results. Specially designed drift bottles with drags have been put off in many hundreds, and for Canada during the year these have covered the interesting regions from Nova Scotia to the Grand Banks. Although moved to and fro in a complicated fashion under the influence of tide, wind and other forces, the water finally makes or circulates in a very definite fashion, which is determined by the configuration of the bottom, even when over fifty fathoms deep. This regularity makes it possible, with certain limitations, to predict where the water will go. As there are great variations in the waters of the region, it will be apparent how important the circulation is in determining the character of the water on any fishing bank at any given time.

Hardly less important is the improvement in the character of the data on the fisheries. From the scientific standpoint, fishery statistics, if properly obtained, would be of a very great value in giving evidence as to any exhaustion in the stock of any given commercial fish. In this way it would be possible to apply remedial measures at an early stage. Not only is the committee making efforts towards the collection of statistics on the fisheries of the international waters, but it is also planning to have the statistics of catches supplemented by periodical special examinations of sample catches by experts. The current statistics are being intensively studied in order to demonstrate at once any peculiarities they may show in the behaviour of the fishes in the various regions, and to have any conclusions therefrom critically tested out in the future collection of statistics.

The movements of the migratory fishes have been and will continue to be matters of international importance. Through the committee the tagging of codfish has already been arranged for and begun. Plans have also been made for the tagging of mackerel. The necessity for further knowledge concerning the habits and life-needs of the important commercial fishes of outer waters has led the committee to arrange co-operative studies of the cod, the haddock, and the mackerel. The study of the halibut is provided for by a special International Fisheries Commission.

## WORK OF BIOLOGICAL STATIONS IN CANADA

ATLANTIC BIOLOGICAL STATION, ST. ANDREWS, NEW BRUNSWICK

The Station was opened June 2, and closed September 15.

*Investigators*

The following is a list of the investigators who were at the station during the season, the subjects upon which they were engaged, and the duration of their stays:—

Mr. H. M. Allan, University of Toronto; June 10 to June 20: Preparation for taking part in warm water survey.

Mr. W. M. Anderson, University of Toronto; hydrographic assistant; June 11 to September 26.

Miss Helen Battle, University of Western Ontario; June 13 to August 26: Abnormal development of fish ova and larvæ.

Mr. H. H. Bell, Dalhousie University; June 12 to June 19: Preparation for taking part in warm water survey.

Dr. C. C. Benson, University of Toronto; August 25 to September 13: Rigor mortis of fish.

Mr. A. F. Chiasson, University of St. Francis Xavier's College; June 10 to June 19: Preparation for taking part in warm water survey.

Dr. Philip Cox, University of New Brunswick; July 7 to August 14: Life-history of the mackerel.

Dr. C. J. Connolly, University of St. Francis Xavier's College; July 18 to August 16: Coloration of fishes, and study of decapod larvæ.

Miss Viola M. Davidson, Toronto, Ont.; June 26 to August 26: Culture of diatoms.

Mr. G. Lyman Duff, University of Toronto; June 5 to August 4: Life-history of the cod.

Prof. J. N. Gowanloch, Dalhousie University; June 9 to September 11: The physiology of the embryonic fish heart, and life-history of the whelk.

Mr. F. Ronald Hayes, Dalhousie University; June 10 to September 4: The life-history of the periwinkles.

Miss R. N. Hearn, University of Toronto; August 20 to September 20: Technical assistant for thermometry in refrigeration.

Dr. A. G. Huntsman, Director; June 4 to June 22, July 5 to August 2, August 16 to October 21: Supervision.

Dr. F. S. Jackson, McGill University; July 7 to August 31: Histology of the pancreas and the pituitary body of fishes.

Mr. W. G. Jones, University of New Brunswick; June 11 to June 19: Preparation for taking part in warm water survey.

Prof. A. B. Klugh, Queen's University; June 5 to September 12: Culture of entomostraca, and measurement of light in aquatic habitats.

Prof. A. P. Knight, Chairman; June 16 to June 20, July 23 to September 7: Supervision.

Dr. A. H. Leim, Ichthyologist; June 4 to October 28: Assisting in supervision; light effects on copepods.

Miss M. M. Lenz, Queen's University; June 13 to August 13: Early stages of fish decomposition.

Dr. J. F. Logan, McGill University; biochemical assistant; June 17 to August 18: The proteins of fish muscle.

Mr. J. R. Martin, Queen's University; June 11 to August 8: The effect of light on marine organisms.

Mr. L. R. Markley, Ottawa, Ont.; June 24 to August 22: The food relations of copepods.

Prof. J. J. R. Macleod, University of Toronto; June 27 to August 2, August 14 to September 15: Further investigations on insulin and related bodies in fishes.

Mr. J. W. MacLeod, McGill University; August 24 to September 1: Experiments with *Gammarus locusta*.

Mr. C. M. McCallum, University of Western Ontario; June 9 to July 11: Preparation for mackerel investigation.

Mr. N. A. McCormick, University of Toronto; July 1 to August 31: The occurrence of insulin in marine animals.

Mr. R. H. M'Gonigle, University of Toronto; June 9 to July 12: Preparation for pile borers investigation.

Mr. A. W. H. Needler, University of Toronto; statistical assistant; June 4 to August 17.

Miss H. M. Perry, Macdonald College; August 6 to September 27: The bacteriology of refrigerated fish.

Professor E. E. Prince, Secretary-Treasurer; August 26 to September 7.

Dr. G. B. Reed, Queen's University; June 18 to July 4: Early stages in the bacteriology and chemistry of fish decomposition.

Mr. W. C. M. Scott, University of Toronto; May 29 to July 11: Development of the eggs and larvæ of the winter flounder.

Mr. R. G. Sinclair, Queen's University; June 5 to August 31: A chemical study of the early stages of the decomposition of fish.

### General Investigations

The weekly and monthly collections of plankton and hydrographic material at established points in Passamaquoddy bay and vicinity and daily records of the temperature of air and water at St. Andrews have been continued.

### Field Investigations

A general survey was made of portions of the Atlantic coast to determine the extent of the warm water suitable for the breeding of lobsters. The following areas were investigated:—

*Chaleur*.—From Shippigan to Charlo, N.B., by Mr. W. G. Jones.

*Halifax*.—From Dartmouth to Jeddore Harbour, N.S., by Mr. A. F. Chiasson.

*Lunenburg*.—From Boutilier to Port Medway, N.S., by Mr. H. H. Bell.

*Shelburne*.—From Shelburne to Argyle, N.S., by Mr. H. M. Allan.

*Sheet Harbour*.—From Halifax to Canso, by the *Prince*.

Under a grant from the Research Council, Mr. R. H. M'Gonigle continued work on the pile borers. With Grand Narrows, C.B., as headquarters, a study was made of the physical factors determining the distribution and abundance of *Teredo*, and in the early fall a special survey was made around Cape Breton island and along the Nova Scotia coast toward Halifax, to determine the distribution of the pile borers on that part of the coast.

Mr. H. C. White, of Queen's University, continued his study of the results of planting trout fry in streams, investigating certain streams in Ontario where fry had been planted.

Mr. C. M. McCallum investigated the life-history of the mackerel, carrying through experiments on the eggs at Shippigan, N.B., and following up the fall fishery with the aid of the *Prince* in the Cape Breton region.

The study of the current by means of drift bottles, in which the countries represented on the North American Committee on Sea Fisheries Investigations co-operate, was continued.

During the season 1,526 bottles were put out on twelve different lines.

The United States Coast Guard cutter *Tampa* put out 500 bottles on three different sections, as follows:—

A. Across Sable island bank, 50 miles.....	100 bottles
B. Across the continental shelf, southeast of Sable island, 50 miles.....	100 "
C. Across the continental shelf, at the middle of the southern boundary of the Grand Bank, 75 miles.....	300 "

The *Prince* put out 1,026 on nine sections, as follows:—

1. Guion Island, C.B., S. by E. 30 miles.....	120 bottles
2. Cranberry Island Bell buoy, N.S., S.S.E., 35 miles.....	140 "
3. Country Island light buoy, N.S., south 25 miles.....	100 "
4. Beaver Island light, south 30 miles.....	120 "
5. Port Hood, C.B., to Cape George, 15 miles.....	60 "
6. Caribou Point light to Wood island, 11 miles.....	66 "
7. Souris, P.E.I., to Mabou, 35 miles.....	140 "
8. Cranberry I. bell buoy, S.S.E., 35 miles (August 1).....	140 "
9. Cranberry I. bell buoy, S.S.E., 35 miles (September 1).....	140 "

1,026

Up to October 1, 245 of these cards had been returned.

#### PACIFIC BIOLOGICAL STATION, NANAIMO, B.C.

Investigators during the summer of 1924:—

Mr. C. J. Berkeley, Nanaimo: Carbohydrate constituents insulin like hormones in kelp.

Mrs. C. J. Berkeley, Nanaimo: Systematic and distributional study of polychaet worms.

Mr. L. L. Bolton, University of B.C.: Microscopic anatomy of the digestive tracts of dogfish, herring, sockeye, salmon, etc.

Dr. W. A. Clemens, Pacific Biological Station: Studies of the rates of growth of fish.

Professor J. B. Collip, University of Alberta: Sugar metabolism in various species of fish, crabs and molluscs.

Mr. Ira A. Cornwall, William Head; Systematic and distributional study of barnacles.

Mr. A. R. Fee, University of B.C.: Parasitic Crustacea infesting fish; systematic and distributional study of Isopoda.

Mr. C. R. Elsey, Point Grey High School: Study of the introduced Japanese oyster.

Dr. R. T. Foerster, Cultus Lake: Life-history of the sockeye salmon in fresh-water.

Professor C. H. O'Donoghue, University of Manitoba: Systematic and ecological studies of nudibranchs, holothurians and Bryozoa.

Mrs. C. H. O'Donoghue, Winnipeg: Systematic study of Bryozoa and the development of *Membranipora*.

Professor J. Tait, McGill University: Mechanism of movement of the operculum of the barnacle, *Balanus nubilus*.

Mr. G. H. Wailes, Vancouver (approximately eight months): Marine and fresh water Protozoa and Algae.

Mr. G. V. Wilby, University of British Columbia: Life-history, rate of growth, etc., of the ling cod.

The following members of the British Association for the Advancement of Science from Great Britain visited the Station in August: Professor and Mrs. F. W. Gamble, Professor and Mrs. Tattersall, Professor W. J. Dakin, Professor D'Arcy Thompson, Dr. T. W. Shann, Dr. Cl. H. Monro, Miss F. A. Randell and Miss M. D. Dixie.

## TECHNICAL CLASSES FOR FISHERY OFFICERS

Under the direction of the chairman of the board a course of instruction in the physical and chemical properties of "fire, air, earth and water," and in some of the principles of biological sciences including bacteriology, was given at the Agriculture College, Truro, N.S., to twenty-one fishery officers of New Brunswick and Nova Scotia.

The course lasted two weeks, opening on January 21 and closing February 3, 1925. Three of the teachers of the college took part in the work of instruction, viz., Professors Barteaux, Harlow and Cunningham. Dr. Cumming, the Principal, generously placed the class rooms, apparatus and other equipment at the disposal of these teachers, so that the instruction was throughout demonstrative and practical.

Dr. Knight's course of instruction dealt with the conditions under which fish live, and the interrelationships of their food supply.

## NATURAL HISTORY OBSERVATIONS

During the summer and fall of 1924, the department's naturalist, Mr. A. Halkett, made observations of the quahaug and scallop on the coasts of the Maritime Provinces in regard to their spawning time and certain particulars concerning their structure and habits.

The observations of the quahaug were made on that part of the coast of Northumberland strait which extends almost from the extreme of Buctouche bay to Shediac bay, embracing these bays and Cocagne bay, during the period from the 30th May to the 4th of August. His conclusions, based upon these observations, are that the actual time when the quahaug spawns is during the latter part of the month of July, and that any spawning before or after that time for any practical purpose is negligible.

His examination of the sex elements of the scallop made at Mahone bay, N.S., and coasts of Gloucester county, N.B., indicated that there is little, if any, essential difference in the spawning time of the scallop of the two localities, and that, as taken together, there is a more or less corresponding gradation in development from non-ripe eggs and milt to a spent condition of the gonads. In this respect past observations of the scallop at Mahone bay are taken into reckoning. That is to say, he had previously determined that the spawning time of the scallop at that bay is during the month of September, and that there the gonads were not thoroughly emptied of their contents until that month was drawing to a close.

I regret to report that the following number of fishermen lost their lives while prosecuting the fisheries during the year: thirty on the Atlantic coast and nine on the Pacific coast.

I am, sir, Your obedient servant,

A. JOHNSTON,

*Deputy Minister of Marine and Fisheries.*

## APPENDIX I

## REPORTS OF INSPECTORS OF FISHERIES

REPORT OF WARD FISHER, CHIEF INSPECTOR OF THE PROVINCE  
OF NOVA SCOTIA, FOR 1924

The prospects at the opening of the year were excellent. The markets for fresh, smoked, pickled and dried fish were in a healthy condition, the demand was good and prices buoyant. The only fly in the ointment was the hazardous position of the canned lobster trade, as the markets had not absorbed the packs of the two preceding years, resulting in a carryover of some 60,000 cases, much of which had to be disposed of at a loss to prevent danger of a collapse of the whole industry, particularly in the event of a large pack for 1924. As a consequence of these conditions the canners' prices to the fishermen were reduced about one-third the usual rates.

This fishery during the whole year was the most unsatisfactory ever experienced. The catch and pack was less than two-thirds normal. The returns to the fishermen, due to greatly reduced catch, 115,275 cwts., as compared with 172,720 cwts., for 1923, and also due to the smaller prices paid by the canners, hardly paid operating expenses in many districts. The canned trade, however, was greatly benefited. The total pack was only 40,831 cases, as compared with 63,971 for the preceding year. This reduction in the pack, together with a reduction of over 25,000 cases for Prince Edward Island, New Brunswick, and the Magdalens, made possible the absorption of a large portion of the carry-over. It may, therefore, be confidently expected that the lobster fishing and canning industry for 1925 will be in a healthy condition, affording profitable employment for the fishermen, and adequate returns to the canners.

The fresh and smoked fish trade continued to be satisfactory so far as the markets were concerned. The demand during the winter and early spring months was greater than the supply. This may be accounted for as follows:—

1. *Quality.*—Improved conditions with respect to handling, processing and marketing have been noteworthy. The dealers are quite alive to the possibilities of increased markets that invariably follow quality goods attractively packaged.

2. *Advertising.*—Better and more consistent advertising has had much to do with increasing the demand for seafoods. In this respect the industry has been greatly benefited by the widely published opinions of expert dietitians and medical authorities, which has afforded valuable assistance in the advertising campaigns conducted during the year.

3. The decrease in the number of persons engaged in the primary occupation of catching the fish. The decrease has continued with the demand. The number of persons engaged in the industry has decreased by about 10,000 since 1914, chiefly in the primary operation of catching and landing the fish. This decrease has been consistent gradually for the ten year period, and is due to extraordinary causes. For instance about 4,000 were lost during the war period. Many abandoned their calling during the years of greatest depression at the close of the war. A further falling-off was noted after the adoption of the American tariff increasing the duties on fresh and pickled fish. Evidence of this decrease in the number of bona fide deep-sea fishermen is seen in the lessened number qualified to receive fishing bounties. In 1914 bounties were paid to 15,361 fishermen. Last year the claims paid had decreased to about 10,000.

To meet any great additional increase in the demands for sea food, there is prime need of either a very considerable increase in the number of fishermen, or the adoption or extension of methods whereby the catches may be largely increased by labour-saving operations. The prosecution of the deep-sea fisheries by the use of small row, sail and motor boats, must pass. Every encouragement should, therefore, be given to better methods, appliances and outfits.

Increased production, particularly from the period from November 1 to May 1, is essential. Excellent opportunities for the development of ports advantageously located are open to enterprising young men of moderate capital. What has been accomplished at Lockeport, for instance, can be duplicated at a number of well located centres, such as Liverpool, Yarmouth, Digby and the Ingonish district.

The dried fish trade was unusually profitable to the producers. The total of all varieties was 276,012 cwts., as compared with 247,620 cwts. for 1923. The Lunenburg fleet had an unusually prosperous year, landing 170,000 quintals, having a total value of over one and a half million dollars. The prices were the highest since 1918, sales being made at \$10.60 per quintal.

The conditions which brought about a reduction of 50 per cent in the number of vessels comprising the Lunenburg fleet, continued. It is quite possible, however, that the coming year will see an addition of some ten sail, as the prosperity of the past year has encouraged those interested in the industry. This is evidenced by the activity of the ship-yards, which have been kept busy on orders for new vessels.

The pickled fish trade was also much better than usual. The herring catch was 267,413 cwts., an increase of over 100,000 cwts., as compared with 1923. The quantity pickled was 23,216 barrels, an increase of over 13,000 barrels.

The mackerel catch was 114,662 cwts., an increase of over one-third as compared with 1923. The quantity pickled was 17,387 barrels, an increase of over 7,000 barrels.

The markets for good quality pickled herring and mackerel were excellent. Much yet remains to be done to encourage the industry. Owing to poor facilities, and poorer methods, many of the fishermen disposed of their catches fresh at a mere fraction of the value of the pickled article.

The total landings of all kinds of fish was 220,630,500 pounds, as compared with 195,439,100 pounds, for 1923, or an increase of over 24,000,000 pounds.

The landed value of the catch was \$6,269,485, as compared with \$5,779,049 for 1923. The total marketed value was \$8,777,251, as compared with \$8,448,385, or an increase of \$328,866.

It should be noted, as intimated above, that the decrease in the lobster catch was nearly 6,000,000 pounds, and the decrease in the marketed value of the catch was over \$1,000,000. This decrease was unparalleled in the industry. Under normal conditions, the marketed value of the fisheries of the province for 1924 would have been nearly \$10,000,000. It is particularly gratifying that notwithstanding the decrease in the lobster catch the total landings of the fisheries was 24,000,000 pounds greater than in 1923.

The following detailed reports by districts of the more important fisheries, will be of interest:—

#### DISTRICT NO. 1, CAPE BRETON ISLAND—Inspector McLeod.

##### THE LOBSTER FISHERY

The catch of lobsters was 28,538 cwt., with landed value, \$191,112, and marketed value \$384,787 as compared with a catch of 46,732 cwt., with landed value \$449,819, and a marketed value of \$730,981, showing a decrease of 18,194 cwt., in the catch, \$258,707 in the value to fishermen, and \$346,194 in the marketed value, compared with 1923.

The large decrease in the catch is due altogether to scarcity, as there were 8,307 more traps operated, and the weather favourable. Fair catches were made at Isle Madame, Richmond county. On the Inverness coast, particularly from Mabou to Hawkesbury, the catch landed was so small that several of the canneries closed before the end of the season. This fishery has been most disappointing, not alone to the fishermen, but to the trade generally. The following shows the catch and pack, with values, by counties, as compared with 1923.—

1924

	Catch		Pack	
	cwt.	\$	cases	\$
Inverness.....	8,675	54,129	4,338	115,934
Victoria.....	5,471	34,912	2,723	92,141
Cape Breton.....	10,295	72,959	4,997	135,368
Richmond.....	4,097	29,112	1,188	28,695
	28,538	191,112	13,246	372,138

1923

Inverness.....	17,366	185,307	8,092	249,766
Victoria.....	8,300	73,731	3,657	139,042
Cape Breton.....	14,602	126,435	7,031	223,234
Richmond.....	6,464	64,346	2,563	76,187
	46,732	449,819	21,343	688,229

In addition to the above there were 315 cases of tomalley packed in 1924, valued at \$3,562.

*Cod*.—The catch of cod was 106,220 cwt., having a marketed value of \$277,726, compared with 89,071 cwt., with a marketed value of \$246,790 for 1923.

This branch of the industry is entirely neglected during the spring months, as the fishermen devote their time to the lobster fishery, which is usually much more remunerative.

The waters of Cape Breton island teem with cod of the choicest quality, and the fishermen should be encouraged to prosecute the cod fishery with greater vigour. Further they need to be induced to handle the catches with greater care, in order to successfully compete with similar product from other counties.

*Haddock*.—The catch of haddock, 61,435 cwt., with a marketed value of \$164,819, compared with 58,059 cwt., and marketed value of \$194,117, for the preceding year, showing an increase in the catch of 3,376 cwt., and a decrease in the marketed value \$29,298.

The increase in the catch is due to two additional trawlers operating from Port Hawkesbury. For some unaccountable reason, the run of haddock did not remain as late as usual in the spring on that portion of the coast from Ingonish to Neil's harbour. Large catches were landed at these ports in the month of December. At Petit de Grat, also, the catch during the fall months was most satisfactory.

*Mackerel*.—The catch of mackerel was 22,600 cwt., with a marketed value of \$134,800, compared with 18,717 cwt., having a value of \$76,989 marketed for 1923, showing increases of 3,883 in the catch, and \$57,963 in marketed value.

The boisterous weather that prevailed on the northern coast of Inverness in October and November seriously interfered with fishing operations from

Margaree harbour to Pleasant bay, as the fishermen could not reach the fishing grounds for many days during this period when fish of largest size and choicest quality was abundant in these waters.

It is most encouraging to note that the fall mackerel caught on the Inverness county coast are much sought after and secure the highest prices. This year New York markets quoted Inverness pickled at \$10 per barrel more than the best Norwegian or American.

*Swordfish.*—The catch was 4,698 cwt., marketed value, \$83,218 compared with 9,364 cwt., and marketed value \$98,639 for 1923. Decreases of 4,666 cwt., in the catch and \$15,421 in marketed value.

These fish were unusually scarce, with the exception of the fishing grounds off Sydney harbour. The North Sydney fishermen had a banner season, landing 1,046 cwt., compared with 141 cwt., for 1923. The fish were large in size, some weighing 700 pounds. The whole catch was shipped to Boston where it sold for about 30 cents per pound. The catch at Louisburg shows a falling off of 3,531 cwt., compared with the preceding year.

*Herring.*—The catch was 36,895 cwt., and marketed value \$69,857, compared with 30,007 cwt., and marketed value \$48,733 for 1923. Increases of 6,888 cwt., and \$21,124 in the marketed value being shown.

Spring herring struck in very plentifully in Sydney and St. Ann's harbours, during the month of May, and the catch would have been very much larger had not the drift ice appeared, preventing the bankers from entering the harbours for bait, and making it necessary to liberate large quantities of herring from the trap-nets.

All along the the southern coast of this island, from isle Madame to Scatarie, herring of the choicest quality appeared in large numbers during the month of July but owing to the low prices offered, and the prevalence of dog fish, many of the fishermen gave but little attention to this branch of the industry.

*Halibut.*—The catch was 2,338 cwt., and marketed value \$36,665, compared with 3,540 cwt., and marketed value \$50,464, for 1923, showing a decrease of 1,202 cwt., and \$13,799 marketed value.

*Oysters.*—The catch was 1,369 barrels and marketed value \$8,806, compared with 2,136 barrels, and marketed value \$12,147, for 1923, showing decreases of 767 barrels in the catch, and \$3,341 in the marketed value.

At Orangedale, Inverness County, the catch has fallen off 666 barrels, compared with 1923. and at Little narrows, Victoria county, the catch decreased 104 barrels, due to high winds and early frost interfering with operations.

*Pollock.*—The catch was 3,508 cwt., marketed value \$6,173, as compared with 1,898 cwt., and marketed value \$4,252 for 1923, showing an increase of 1,610 cwt. in the catch, and an increase of \$1,921 in the marketed value. At L'Ardoise, where these fish were very numerous, the catch shows an increase of 1,140 cwt. The largest landing was at Port Hawkesbury, the quantity being 1,543 cwt.

It may be of interest to note that in 1753 under French rule the value of the Cape Breton fisheries was \$676,289. The total production reached 98,450 quintals of fish, and 1,154 barrels of oil. Louisburg was the principal fishing station, but vessels also operated out of other ports. For the year under review, this island yielded only 117 barrels of cod oil and 8 barrels of whale oil. The inspector writes:—

"Consumption of fish is increasing very slowly, and the hope is, that by more publicity and enlightenment on the value of fish as a health food, and the desirability of encouraging its consumption the fisheries may be made much more valuable than they are at present. However, though the fishing industry may advertise on a costly and extensive

scale, and do all in its power to stimulate the interest of the public in this direction one thing is certain, and that is, that, unless much greater care is taken in the handling and preserving of their product to make it more appetizing they cannot expect anything more than a temporary increase in the demand.

"It is again my happy privilege to draw your attention to the most satisfactory services rendered by the overseers of fisheries, and I can assure you that the protection and perpetuation of our fisheries are at all times the first consideration of our loyal and competent officers."

## DISTRICT No. 2, EASTERN MAINLAND—Inspector Sutherland

As pointed out in a previous report, there are two classes of fishermen in this district, viz: farmer-fishermen and fishermen proper. The former live along the Northumberland straits and are chiefly interested in the lobster fishery. The latter, who depend entirely on the fisheries for their livelihood, live along the eastern shore, or on the coast of Halifax, and Guysboro counties. On the Bay of Fundy portion of this district, farmer-fishermen are also found, but the fisheries of these waters are not so extensive, and fishing is not one of the principal occupations.

During the 1923 seasons, the operations of the farmer-fishermen were most satisfactory, as lobster fishing was very successful. The fishermen proper, however, did not generally share in the prosperity, as the prices for ground fish were low, and there was not a ready demand for their products.

The result of the 1924 operations shows a reversal of these conditions, with a decrease of \$336,852 in the landed value and of \$414,793 in the marketed value of lobster fishery, and large increases in the values of cod and mackerel. The outstanding feature of the year's operations was the failure of the lobster fishery with greatly reduced prices to the fishermen. This, of course, was chiefly felt along the Northumberland straits.

## THE LOBSTER FISHERY

The catch of lobsters was 36,883 cwt., with a marketed value of \$525,764; as compared with 60,348 cwt., with a marketed value of \$978,133, for 1923.

The outstanding feature of the fishing operations for the year was the large decrease in the quantities and value of lobsters both to the fishermen and the packer.

The catch was 23,465 cwt. less than for 1923 with a decrease of \$452,339 in the marketed value. The decrease was general but the canning districts along the Northumberland straits suffered more heavily as they depend almost entirely on the lobster fishery.

In Halifax county west very few fishermen engaged in fishing during the spring season, and only 84 cwt. were landed. In the December season, however, 600 fishermen were engaged with approximately 30,000 traps. This season was fairly successful with satisfactory prices. All the catch of 560 cwt. was shipped fresh, valued at \$16,800 to the fishermen. In the eastern part of the county where there is only a spring season with no size limit, the catch decreased 1,589 cwt. The lobster fishery in this county is in a critical condition and some remedial steps should be taken at once if it is to be saved.

In Guysborough county the catch and pack both show considerable decreases but the quantity shipped in shell is slightly greater than for 1923 and of greater value. Owing to rough weather and late ice conditions, fishing did not generally begin for two weeks after the season opened.

In Antigonish county the first traps were set on May 8, about two weeks after the opening of the season, and packing did not become general until May 15. After that date ideal weather prevailed. The catch shows a decrease of 4,543 cwt. and there were 1,942 less cases packed than for 1923. Average price paid to fishermen \$8.50, compared with \$10.50 for 1923.

In Pictou county ice and weather conditions delayed the season at least two weeks, and the results of the season's operations show a decrease in the catch of 9,273 cwt., and in the pack of 4,771 cases. The loss in marketed value in this county alone was \$183,381, a direct loss to the fishermen of \$121,387 in landed value. During the year about 650 cwt. of lobsters were shipped in shell from this county, which formerly was purely a canning district.

In Colchester and Cumberland counties similar conditions to those in Pictou county and Antigonish existed, with decreased catches, and operations retarded by ice and weather conditions during the Spring season. The fall season in Cumberland county west—the catch was 1,251 cwt., valued at \$12,510, compared with 1,360 cwt., valued at \$13,636 in 1923 and the pack 395 cases, compared with 586 cases. Fresh shipments show a slight increase. The following shows the catch and pack, with values, by counties, as compared with 1923:—

1924

	Catch		Pack	
	cwts.	\$	cases	\$
Halifax.....	3,112	46,456	591	15,180
Guysboro.....	7,272	72,420	1,912	50,665
Antigonish.....	6,413	46,789	3,531	92,535
Pictou.....	12,302	95,982	6,379	158,328
Colchester.....	680	4,760	340	8,860
Cumberland.....	7,104	51,874	3,293	83,560
	36,883	318,281	16,046	409,128

1923

Halifax.....	5,892	84,244	1,321	43,667
Guysboro.....	9,717	103,068	3,280	102,860
Antigonish.....	10,956	117,844	5,473	171,660
Pictou.....	21,575	217,369	11,150	337,135
Colchester.....	918	11,018	453	13,740
Cumberland.....	11,290	120,996	5,493	165,477
	60,348	654,539	27,175	834,599

In addition to the above there were 303 cases of tomally packed in 1924, valued at \$2,717.

The season closing on June 25 along the Northumberland straits was extended until July 5, but proved to be of very little value to the industry. Only 784 cwt. were landed and 251 cases packed, 130 fishermen and 13 canneries engaged.

*Cod.*—The catch was 259,284 cwt., valued at \$548,657, as compared with 178,932 cwt., valued at \$308,019, for 1923. An increase of 80,352 cwt., in the catch and \$240,638 in value. Of the total catch 126,761 cwt., was taken off shore by vessels and steam trawlers, three of the latter landing at Halifax, and two at Canso, and accounting for the bulk of the catch. The marketed value of the catch was \$781,046. Prices for dried cod were very satisfactory during the latter part of the year, fishermen received as high as \$10.50 per quintal. Average prices were: dried, \$8; smoked fillets, \$12; boneless, \$10.

*Haddock.*—The catch was 142,087 cwts., valued at \$286,548, as compared with 159,359 cwts., valued at \$286,390 for 1923. A decrease of 17,272 cwts., but a slight increase of \$158, due to better prices. The smaller catch was due to decreased landings in Halifax county west and Guysboro county east, and to bad weather during January and February when the smaller boats were unable

to operate profitably. The marketed value of Haddock was \$449,079 a considerable increase over the previous year. The quantity taken off-shore was 106,915 cwts., by vessels and steam trawlers. Average market prices for haddock were: smoked, \$8; smoked fillets, \$11; dried, \$7.

*Pollock.*—The catch was 27,707 cwts., valued at \$37,174, as compared with 15,822 cwts., valued at \$18,775. An increase of 11,885 cwts., and \$18,399 in value. Of the catch 11,478 cwts. was taken off-shore. The increase is due to heavier catches in Halifax county west where the inshore fishing was better than for some years.

*Halibut.*—The catch was 14,377 cwts., valued at \$164,677, as compared with 6,885 cwts., valued at \$84,663 for 1923. An increase of 7,492 cwts., and \$80,014 in value, due to the catches of a halibut trawler being operated by the National Fish Company, of Halifax. The marketed value of halibut was \$231,-859 in 1924 and \$117,559 in 1923.

*Herring.*—The catch was 83,948 cwts., valued at \$78,096, as compared with 70,527 cwts., valued at \$53,519 for 1923. An increase of 13,421 cwts., and \$24,577 in value, due to larger catches in Antigonish, Guysboro counties and Halifax county west. The catch in Cumberland county, where only spring herring are taken, fell off 7,448 cwts. This catch is all smoked or used for lobster bait. The figures for Halifax county west, where the catch increased 3,191 cwts., does not signify the run of herring. Much larger quantities could have been taken if there was any certainty as to price. The fishermen have not yet recovered from the scare of 1922, when pickled herring sold for \$3 and \$3.50 per barrel. The marketed value of the catch was \$161,028 in 1924 and \$123,549 in 1923.

*Mackerel.*—The catch was 61,126 cwts., valued at \$189,566, as compared with 34,628 cwts., valued at \$89,093, for 1923. An increase of 26,498 cwts. and \$100,473 in value, due almost entirely to heavier catches in Halifax county west where both spring and autumn runs were good. The Spring fish were practically all small mediums, and did not command good price owing to heavy catches by American purse seiners. At times during the Spring, fish buyers would not handle any fresh fish, as the price was too low on the Boston market to clear a profit. These conditions forced the fishermen to salt their catches, which brought about \$9 per barrel. The price during the autumn run was somewhat better, but a number of fishermen salted their catches which brought satisfactory returns—\$16 per barrel. The marketed value of the total mackerel catch for this district was \$376,188 in 1924 and \$179,088 in 1923.

*Albacore.*—The albacore catch decreased 1,258 cwt., but this is no indication of the run. In St. Margaret's bay where these fish are taken the actual catch there was the largest ever made, but owing to extremely low prices on the American market, the fish were released.

*Swordfish.*—The swordfish catch also decreased considerably, only 696 cwt., being taken, compared with 4,961 cwt, for 1923. The decrease in value being \$29,200, incidentally the largest decrease of any fish for the year with the exception of the lobster. The marketed value was \$9,417 in 1924 and \$56,165 in 1923.

*Shad.*—The shad fishing in the Bay of Fundy shows a decrease in catch of 121 cwts.

The total landed value of the catches was \$1,807,481, as compared with \$1,694,408 for 1923. The total marketed value was \$2,865,281, as compared with \$2,924,128 for 1923. This shows an increase in the landed value of \$113,073, but a decrease in the marketed value of \$58,847, which is accounted for by the decrease of \$452,369 in the marketed value of lobsters.

The marketed value of the catch is shown by counties, as compared with 1923, as follows:—

	1924	1923
	\$	\$
Halifax.....	1,401,254	1,053,509
Guysboro.....	887,008	1,008,589
Antigonish.....	164,886	223,730
Pictou.....	211,400	385,226
Colchester.....	25,441	24,474
Cumberland.....	164,217	222,135
Hants.....	11,075	6,465
	2,865,281	2,924,128

The above bears out the statements made in the introduction, the big lobster-producing counties all show a decrease, while Halifax, where general fishing is carried on, shows a substantial increase.

The total catch for 1924 was 661,680 cwt., compared with 560,751 cwt. for 1923, or an increase of 100,929 cwt., due chiefly to larger catches of cod, mackerel, pollock and halibut.

Thirty-two convictions were secured against violation of the Fisheries Act, and a large quantity of illegal gear confiscated, among which was fifty-two salmon nets.

DISTRICT No. 3, WESTERN MAINLAND—Inspector Marshall

THE LOBSTER FISHERY

The lobster catch shows a considerable decrease, as compared with the previous year, both in the quantity taken and the value of same. The catch was 49,854 cwt., valued at \$857,704, as compared with 65,640 cwt., valued at \$1,134,829, for 1923. The catch and pack, with values, by counties, as compared with 1923, is as follows:—

1924

	Catch		Pack	
	cwt.	\$	cases	\$
Lunenburg.....	1,224	19,107	161	4,43
Queens.....	2,727	43,004		
Shelburne.....	15,785	259,683	3,655	98,130
Yarmouth.....	23,591	380,503	7,007	192,640
Digby.....	5,658	130,142	716	18,797
Annapolis.....	695	18,305		
Kings.....	174	6,960		
	49,854	857,704	11,539	314,003

1923

Lunenburg.....	1,552	20,084	261	7,976
Queens.....	2,000	25,369	466	13,995
Shelburne.....	16,242	298,891	3,864	130,823
Yarmouth.....	32,340	520,539	8,266	273,891
Digby.....	12,003	231,571	2,596	90,992
Annapolis.....	1,358	34,750		
Kings.....	145	3,625		
	65,640	1,134,829	15,453	517,677

There were approximately 1,500 men less engaged in this fishery in 1924 than there were in 1922, and about 800 less than there were in 1920. There were also 100,000 less traps used in 1924 than in 1920, and without doubt this would account in a large measure for a certain amount of the decrease in the catch.

*Cod*.—The total catch of cod was 764,769 cwt., valued at \$2,002,313, as compared with 780,940 cwt., valued at \$1,368,555, for 1923, which shows an increase in value of \$633,758 over the previous year, and is entirely accounted for by the price received by the fishermen.

*Haddock*.—The total catch of haddock was 117,282 cwt., valued at \$218,046, as compared with 79,605 cwt., valued at \$144,752, for 1923, showing an increase in value of \$73,294.

*Hake and Cusk*.—The total catch of hake and cusk shows a marked increase over the previous year. The catch was 107,001 cwt., valued at \$99,305, as compared with 49,651 cwt., valued at \$45,842, for 1923, showing an increase of \$53,463.

*Pollock*.—The catch of pollock for the district was 15,181 cwt., valued at \$17,979, as compared with 24,688 cwt., valued at \$22,538, for 1923, showing a decrease in value of \$4,559. There has been a decrease in the catch and value of this fish each year for the past several years.

*Halibut*.—The catch of halibut was 10,692 cwt., valued at \$138,877, as compared with 8,772 cwt., valued at \$128,806, for 1923, showing an increase in value of \$10,071.

*Herring*.—The catch of herring was 146,570 cwt., valued at \$163,821, as compared with 65,352 cwt., valued at \$70,513, for 1923, showing an increase in value of \$93,308.

*Mackerel*.—The catch in mackerel shows an increase in quantity and value over the previous year. The catch was 30,936 cwt., valued at \$152,851, as compared with 25,839 cwt., valued at \$107,764, for 1923, showing an increase in value of \$45,087.

*Scallops*.—The catch of scallops was 7,504 barrels, valued at \$45,920, as compared with 11,839 barrels, valued at \$68,337, for 1923, showing a decrease in value of \$22,417. This is accounted for in a measure by there being fewer men engaged in this business as I find there were 298 licenses sold in 1923 while only 218 were issued in 1924. The weather conditions also had a marked effect on the operations of this fishery, as we had a considerable amount of windy weather during the greater part of last winter.

The total catch for the district for 1924 was 1,264,001 cwt., with a value of \$3,775,793, as compared with 1,128,462 cwt., valued at \$3,189,963, for 1923, showing an increase of \$585,830. This increase is largely accounted for by the increased price received by the fishermen over the previous year, and while no more men or vessels were engaged in the operations off-shore, those that did engage in it received fair remuneration for the year's service, so that when the operations on the whole are taken into consideration there has been a considerable improvement in the district over the previous year.

There were thirty-five confiscations and twenty-three prosecutions with nine sales of confiscated articles.

There has been one new cold storage plant constructed in the district during the last year, at Yarmouth, and is now in operation, valued at \$80,000. This plant should be of great benefit particularly to the herring and mackerel fishermen.

There have been a number of vessels constructed during the last year, but up to the present time it is impossible to advise whether these vessels are to go into the fish trade or into the coasting business.

## THE SALMON AND INLAND FISHERIES

As both the commercial and domestic salmon fisheries depend on the success of the parent fish in reaching the spawning areas of the inland waters, the available statistics of the catches may be given under the same caption. It should be noted that the terms "Commercial" and "Domestic" differ with respect to the mode under which the fish are captured. The "Commercial" applies to fish taken by nets or traps in the coastal waters and in the tidal waters of rivers where netting is permitted. The "Domestic" refers to angling with rod and line.

*Cape Breton Island.*—The commercial catch was 3,561 cwts., landed value \$43,365, marketed value \$58,036, compared with 3,935 cwts., landed value \$49,265 and \$63,386 marketed value, for 1923, showing decreases of 374 cwts. in the catch, \$5,900 in the landed value and \$5,350 in the marketed value.

These fish were unusually abundant from Inlet to Nyanza, Victoria county. The catch in nets set along this part of the district was most satisfactory. It should also be noted that the catch of salmon in cod trap-nets from Ingonish to Neil's harbour has greatly diminished the past two years, though no change has been noticed in the catch of the ordinary salmon trap-net.

The conditions with respect to angling were not as favourable for sport fishing as 1923. The extraordinary drought from the middle of June until the latter part of August lowered the waters in the rivers and lakes, resulting in conditions not conducive to successful angling. While salmon in large quantities ascended the Margaree river up to the 15th of June, many remained in the lower pools where they showed little inclination to rise to the fly. However, from the 1st to the 15th of June, and after the freshets that occurred the latter part of August until the close of the season, the sportsmen made very satisfactory catches.

The catch with the fly, in the Margaree, was 699, compared with 1,066 for the previous year. It must be remembered that the conditions existing throughout the entire season in 1923 were ideal, as occasional rains kept the river fairly high, and the water cool and not too clear. Under similar conditions the catch this year would have been equally good. The few fly fishermen who visited Little river, Cheticamp, had a good season, their catch being 131 salmon.

Four fish were caught with the fly at North river, St. Ann's, and seven in Middle river. These were evidently produced from fry taken from an early run of salmon in the St. John river and planted in Middle and Baddeck rivers a few years ago, as previous to 1923 no salmon were ever captured with the fly in Middle river.

*Eastern Mainland District.*—The commercial salmon fishery shows a slight increase of 291 cwts. over 1923. The catch was 5,400 cwts., the highest since 1913 when 5,600 cwts. were taken. Substantial increases are noted for Pictou, Antigonish and Guysboro counties and the Bay of Fundy waters, but there was a decrease of 1,247 cwts. in Halifax county west owing to the failure of the Prospect fishery.

The anglers had excellent sport fishing the past year. The run in the St. Mary's river, Guysboro county, was the greatest on record. The numerous streams and lakes of Guysboro county, and Halifax county provide unexcelled opportunities for the sportsman and tourist. It is most difficult to obtain even approximately the amount of the catches but the popularity of these waters is evidenced by the increasing numbers of fishermen each year. The principal salmon streams to which there is access receive proper attention from the hatchery superintendents each year, and a number of the best trout lakes are also systematically stocked. The distribution of fry had been greatly improved in this district during the past year and further improvements are looked for.

Experience has shown that there is a great destruction of young salmon each year by the "small boy" innocently angling for trout in the smaller brooks and streams, and I think that a little education in the schools would overcome this practice. Very few boys will wilfully destroy salmon in the parr or smolt stage, but being unable to distinguish between salmon of these ages, and small trout a great many of the former are innocently destroyed. I would suggest that posters showing coloured cuts of salmon smolt and trout, and explaining how they can be distinguished, one from the other, be distributed to the schools, with instructions how to properly liberate salmon, or undersized trout. I may add that the popular impression is that there are two kinds of brook trout, one known as "salmon trout," which is really the small salmon, and the other as ordinary trout.

It may be mentioned that about 200 salmon were tagged in river Philip, Cumberland county, during November for the purpose of ascertaining whether the run in that river comes from the east or west, and also to obtain more information of the movements of these fish after they leave fresh water.

During fall months the usual difficulties were experienced in endeavouring to provide protection to spawn salmon in the rivers along the Northumberland straits. The matter has been previously reported on different occasions and I regret to state that the situation is not improving. The spawning runs in the various rivers are increasing each year, and poaching is therefore more difficult to prevent.

The inspector writes:—

"I cannot speak too highly of the work of the overseers in endeavouring to cope with these conditions but in the rivers west of Pictou, especially where no legal coastal fishery is established, it is impossible to educate the public to a point where they will be sympathetic to protective work. The general feeling prevails that the residents on the river banks have a right to a share of the fall run regardless of the fact that the season is closed and that salmon are in the rivers only for the purpose of propagation. Conditions on river Philip are probably worse in this respect than any other river in Nova Scotia, and it requires the utmost efforts of the officers, day and night, to suppress commercial poaching. As I previously brought to the department's notice, it is my firm belief that a valuable coastal salmon trap-net and drift-net fishing could be developed all along the Northumberland straits, if the spawning fish received efficient protection for a short number of years, and a systematic stocking programme was carried out."

*Western Mainland District.*—The catch shows a decrease, particularly in the coastal waters, being only 1,166 cwts., with a value of \$29,885, as compared with 2,173 cwts., valued at \$50,270, for 1923. The greater portions were taken by trap-nets and gill-nets.

It is confidently expected that the improved fishways on the Mersey river, Queens county, and also the completion of similar improvements on rivers in Yarmouth and Annapolis counties, together with a systematic continuance of restocking the streams with salmon and trout fry, will greatly assist in the development of the fishery of this district.

The development of the tourist business has awakened a lively interest in the sport fishing facilities of the province, as it is quite evident that angling is one of the best attractions that can be held out to visitors. Nor should it be forgotten that the province furnishes a larger proportion of resident anglers than can be found in any other section of the country. Therefore the work of the Fish Culture Branch of the department in restocking the streams has a most important bearing on the development of a very lucrative tourist business. The physical improvement of the stream, and the protection of the water, should also be a matter of price consideration.

A correct report of the trout catch is much more impossible than that of salmon, as trout fishing abounds in hundreds of streams and lakes, visited by many thousands of anglers. The reported catch for Cape Breton island was 95 cwts., landed value \$1,171, marketed value \$1,249, as compared with 22

cwts., with a landed value of \$320, and marketed value \$490, for 1923; showing an increase of 73 cwts. in the catch, \$851 in the landed value, and \$759 in the marketed value. These fish entered Trout river, lake Ainslie, the first week in July and continued very plentiful until the end of the season. In July, 1,705 were taken with hook and line, in August 4,540 and in September 1,018, making a total of 7,263. Fine catches of magnificent trout were made at river Dennis and Indian river, Whycocomagh, Inverness county, Middle river, Baddeck river, Clyburn's and Warren's brooks. Ingonish and Salmon river, cape North, Victoria county. Largest catch at Trout river, lake Ainslie.

In the Eastern Mainland district the reported catch was 16,800 pounds, as compared with 14,100 for 1923. Large catches were also taken in the Western district, which included the well-known sporting districts of the Mersey river and tributaries, Kejimikujik, lake Rossignol, Jordan river, Tusket river and Bear river.

### UTILIZING OF FISH WASTE

The successful utilization of the vast quantities of fish waste has been a problem of increasing vexation, and large expenditures have been made in the establishment of plants for the reduction of fish waste and waste fish into commercial fertilizers or other products, but without the financial success necessary for the continuance of the establishments, as the operations usually included not only an expensive plant but also the employment of a steam vessel or motor craft for the collection of waste from a quite extensive shore area. The expense involved in collecting a sufficient supply to keep a large plant in continuous operation precluded any possibility of financial success.

It is quite probable, however, that the difficulties in connection with such establishments will be solved by the plant now being established at McKenzie's wharf, Halifax, by Mr. C. W. Kendall, who has had much experience in similar plants at Grimsby and other large fishing ports in England, where the process he is introducing in Halifax has been used with great success.

The Halifax plant is of moderate cost, and can be operated at comparatively little expense. The supply of waste to be provided by the National Fish Company, will be sufficient for preliminary operations. It is the intention to begin operations with a two-unit process, and to continue adding units until the capacity is sufficient to care for all the waste in the Halifax district, which will include the waste from the landings of the trawlers of the National Fish Company, the Leonard Fish Company, and also the landings of large quantities of waste that has hitherto been thrown overboard while the trawlers are at sea.

In addition to the manufacture of a fine grade of fish meal Mr. Kendall utilizes the cod livers for oil, which he purposes refining, and also utilizes the oil from the waste fish.

A market is ready in England, Germany, Japan and China. The German market is now open for three thousand tons, and the product can be placed in the English markets in successful competition with the English product.

It is the intention of Mr. Kendall to establish a similar plant at Port Hawkesbury during the present year, and he also contemplates plants at other fishing centres.

The process used is odorless, in so far as the manufacture of the meal is concerned, and it is proposed to manufacture the oil so as to avoid any offensive odors.

It takes about five tons of waste to manufacture one ton of meal. Mr. Kendall expects that ultimately he will manufacture about fifty tons of meal each week. The meal is highly prized as a poultry and cattle food, for which at present there is little market in Canada.

## FISHERIES PROTECTION SERVICE

The *Arras* continued the work of the previous year with the Grand Banks fishing fleet. The following is a report from Captain Barkhouse, covering this phase of her services:—

Dr. Stanley Harcott Peppard was appointed to the service on June 26 this year, and joined the *Arras* at Halifax the following day. On June 29 the ship left port and proceeded towards the Grand Banks, arriving at Cape Broyle on July 3. Part of the Lunenburg and LaHave fleets were then at that port seeking bait.

On July 4 we left with the above mentioned vessels for the Grand Bank and located the remainder of the fleet 25 miles southeast of Virgin rocks. From then until the end of the season we kept in constant touch with the vessels, both in port and on the banks, and gave medical aid to eighty-five fishermen and in various other ways gave the fleet information of value to the work, such as where to obtain bait, weather reports, etc.

The fishing season on the Grand Bank having ended September 2, we left there on that date and went to the St. Pierre Bank. Finding the fleet working west we kept in company with it and arrived at Sydney on September 6. On the 9th, went to Middle Grand Bank and remained there until the 13th, when we returned to Halifax.

This year the Lunenburg and LaHave fleets consisted of fifty-eight vessels, comprising a total crew of approximately 1,175 men. The average catch was 1,500 quintals. Operations commenced earlier than former years, this being due to the fact that squid for baiting struck in on July 10, and the first baiting was taken on that date. But contrary to former years no squid were available on the banks, a condition that was unknown for a number of years. This required that the vessels go to port for every baiting and much time was lost on this behalf. Fishermen of long experience stated that this was the first season they could recall that no squid were taken on the fishing grounds.

Another unusual feature this year was that the fish were scattered all over the bank and no large catches were made in any one particular place. This was probably due to the absence of any polar current, there being no icebergs whatever observed this year.

The French fishing fleet was scattered, part working on the Grand Bank whilst the remainder confined operations to the St. Pierre Bank. The French beam trawlers evidently have learned to respect the presence of the *Arras* on the ground, observing that their operations this year were apparently carried out on legitimate lines and we did not have one complaint, which is quite a contrast to former years.

I have heard many expressions of approval of the Department's policy of providing medical aid for the fishermen.

I must again draw your attention to the unfitness of the *Arras* for the work. As pointed out in my report last year, a larger ship with modern facilities is a necessity. Medical aid should be continued and enlarged and to do this a vessel with hospital accommodation should be provided. A ship capable of handling at least four cot cases appears to be an absolute necessity. This year we had three severe cases that had to be taken to St. John's for hospital treatment. One patient eventually died and perhaps his life may have been saved had he been able to get hospital care when his ailment was first discovered. The doctor did admirable work this year but much more is possible with enlarged accommodation. This, sir, is a matter that is respectfully submitted for your earnest consideration.

As the work of the *Arleux* was of a most valuable character, the following from the report of Captain Cousins will be of interest:—

July 20. Captain Milne taken ill and entered hospital at Lunenburg. H. P. Cousins, 1st officer, taking charge of *Arleux*.

July 21. Proceeded to take up work of locating new scallop beds and illegal fishing in vicinity of Mahone bay and Chester basin. Located scallop bed east of Little Duck island. Proceeded westward towards Bay of Fundy looking after illegal fishing and locating new scallop beds.

August 20. Located new scallop bed 6 miles N.N.W. of Lurcher shoal.

August 22. Located new scallop bed 8 miles west of Brier island. This bed covers a large area and gave good results and no doubt runs from Lurcher shoal to west of Brier island, continuing up the Bay of Fundy to Digby. It is the intention of some of the fishermen at Yarmouth and Westport of fitting out boats and operating these scallop grounds next season. The boats at Digby this season did well scallop fishing off Digby gut and Centreville outside of three-mile limit.

September 6. Proceeded to Louisburg to watch the American sword fishermen. The local Cape Breton fleet was not as large this year as previous years, and the catch of swordfish much smaller than last year. Remained with the sword fishing fleet until September 17 when the last American sword fisherman left the coast. Ship then proceeded to Kent county, N.B. Northumberland straits, to look after illegal lobster fishing, destroying a large number of lobster traps and gear. By keeping in close touch with this district, illegal fishing was discontinued in a short time. A great deal of illegal lobster fishing is carried on in this district and a large number of illegal lobsters are smuggled to factories operating in other districts where the open season is on. The *Arleux* remained in this district until October 15, then ship returned to western coast of Nova Scotia watching American mackerel netters and illegal fishing until December 6, when ship proceeded to Canso to protect the Canso fishing fleet during the winter haddock fishing season, breaking ice in the St. Peters canal and locks, and releasing and assisting vessels through ice.

During the month of December, the weather was rough. Fishermen reported fairly good fishing when weather permitted.

December 16. At 12.50 p.m. received message that a fishing craft from Petite de Grat was drifting to sea in the strong northwest gale. The *Arleux* at once proceeded to sea in search of fishing craft. 2.30 p.m. passed tow line to fishing craft *J. C. Martin*, disabled, with sails blown away and engine out of commission. Lost one dory and a large quantity of fishing gear. Short of provisions with eight men on board. 3 p.m. proceeded with fishing craft in tow. 6.40 p.m. arrived at Petite de Grat harbour. Motor boat came alongside and towed fishing craft in inner harbour.

December 17. Proceeded to protect the fishing fleet at Canso.

December 30. Proceeded to St. Peters canal to break ice and release vessels.

December 31. Released schooners *Vandella* and *Eva May*, coal laden. Towed schooners to Canso.

January 4. Proceeded to St. Peters canal to break ice in locks, and canal, and release vessels.

January 5. Released schooner *Janie F*, coal laden, in a leaking condition. Towed schooner through locks to west end of canal. 6.30 p.m. schooner reported in a sinking condition. Ship's company rendered assistance to schooner by pumping and taking part cargo of coal out to lighten schooner and save her from sinking.

January 6. Proceeded to protect fishing fleet off Canso. Towed in fishing boat with engine trouble.

January 8. Proceeded westward towards Sheet harbour.

January 9. Proceeded from Sheet harbour with schooner *Edith F. S.* in tow for Guysboro.

January 11. Arrived at Guysboro with schooner in tow and proceeded to Canso with fishing fleet.

January 15. Fishing boats at Canso laying up for the winter. Fish moving westward. Canso harbour full of drift ice. Ship lying at Canso waiting orders.

January 17. Proceeded, cruising westward towards Halifax.

January 20. Arrived at Halifax. Proceeded westward towards LaHave. 1 p.m., breaking ice in LaHave river and releasing vessels *Donald 2nd* and *Norma L. Conrad*.

January 21. Breaking ice in LaHave river. Released schooners *Aubrey Brown*, *W. H. Murray* and *Dawn*.

January 22. Proceeded towards Lunenburg to break ice and release vessels. 3 p.m. breaking ice in Lunenburg harbour and releasing vessels.

January 24. Moored ship at Railway wharf, Lunenburg for refit.

#### PATROL BOAT "MILDRED MCCOLL"

This boat was in commission from April 17, 1924, to January 17, 1925, and covered the coast from Lunenburg to Mulgrave during the spring months. Reference has previously been made to the work of this boat during the fall lobster season in Cumberland county. Later she proceeded again to the eastern shore, patrolling the coast, particularly Halifax county west, during the December lobster fishing season until she was laid up. Captain Williams is a most reliable officer, and under his direction the boat accomplished most effective work during the year, especially in Cumberland county.

#### PATROL BOAT "A"

This boat has given good satisfaction, keeping up fairly steady patrol between Pubnico and cape Blomidon. The services of this boat should be continued throughout the year, as her work is of great benefit to the lobster fishery in preventing illegal fishing along the shores, particularly as no fishery guardians are employed on any part of the coast of this district.

### REPORT OF INSPECTOR J. F. CALDER, DISTRICT No. 1, PROVINCE OF NEW BRUNSWICK, FOR 1924

This district comprises the counties of Charlotte, St. John, Albert, and the Bay of Fundy watershed of Westmorland county.

The value of the fisheries of this district during the present year was about twenty per cent greater than that of the previous year. The marketed values of the catch for the present year is as follows: Charlotte county, \$1,687,958; St. John county, \$334,387; Bay of Fundy watershed of Westmorland county and Albert county, \$8,266, making a total of \$2,030,611, against \$1,663,681 for 1923.

#### COD

An average catch of cod was made during the year, the yield amounting to 29,134 cwts., which was a considerable improvement over 1923, but below the catch for 1922. There was a good demand for cured cod fish at fair prices during the season.

#### HADDOCK

Fourteen thousand, eight hundred and ninety-two cwts. of haddock were taken this year, which is nearly three times the quantity that was taken during the previous year. Haddock fishing was better than it has been for twenty years past.

## HAKE

About an average catch of hake was made during the season; 49,356 cwts. were taken against 17,912 cwts. for 1923, while the catch for 1922 was 85,503 cwts. There was a fair demand for hake during the summer months, but the catch was quite light.

## POLLOCK

The pollock fishery was practically a failure, only 8,391 cwts. being taken against 28,841 cwts. for the previous year. The scarcity of pollock was general along the whole Atlantic seaboard.

## HERRING

The herring catch was fairly satisfactory, and the smoked herring business was very good. A fair pack was put up at Grand Manan and are being sold at a good price. The "sale for export" condition which was placed in the herring weir licenses during the season, was very helpful to our smoked herring industry. Heretofore, large quantities of herring suitable for smoking purposes were sold fresh to the packers at Lubec and Eastport, Maine. As they would not pay the price required by the "sale for export" clause in the licenses, our fishermen were compelled to smoke their catches themselves. The result has been that our people have received twice as much out of the fishery as they would have by selling the fish fresh, as they had done in the past. I may add that the value of our smoked herring product amounted to \$109,852.

## SARDINES

A good average catch of sardine herring was made during the season; 269,643 barrels were taken, against 134,494 barrels for 1923, which was an exceptionally poor season, and 223,353 barrels for 1922. The sardine canners began operations on April 15, with all of them paying a price of \$12 per hogshead at the weirs. They continued to pay this price until the latter part of May, when they arbitrarily put the price to \$6 per hogshead over night. Realizing their inability to successfully cope with the situation, the licensees appealed to the department for assistance in dealing with the combination of packers. A meeting of the licensees was held at St. Andrews early in June. The Premier of New Brunswick, Hon. P. J. Veniot, was present, on the invitation of the fishermen. Mr. J. J. Cowie, and I represented the department. A resolution was unanimously passed, setting forth the material facts in connection with the situation, and requesting the department to prohibit the exportation of herring from the weirs unless \$10 per hogshead at least had been paid for the same. The department readily consented to insert such a condition in the herring weir licenses. The condition became operative on June 12. From that date until the factories closed up, about the middle of October, over 42,000 hogsheads of herring were exported from the weirs. The difference in the amount obtained by the fishermen from the price they received, as a result of the "sale for export" condition, and the price that was being paid up to June 12, is nearly \$170,000; as a matter of fact, I believe that the fishermen have gained a great deal more than \$170,000 by this regulation, for if it had not been adopted, there is no question but that the price would have fallen to a much lower figure than \$6 per hogshead. I am pleased to add that the sardine canners, who were bitterly opposed to this condition at first, are now in favour of it, as it has helped to stabilize the canning business. A canner can now go ahead and put up goods when the market is dull and hold them for future sale without running the risk of a competitor stepping in and getting a cheaper supply of raw material.

## SALMON

There is little to note in connection with the salmon fishery during the present year, as the catch was about an average one; 2,793 cwts. were taken with a marketed value of \$50,499.

## CLAMS

A large increase is to be noted in the quantity of clams taken as compared with the previous year; 23,907 barrels were taken this year, against 13,057 barrels for 1923.

## SHAD

The spring run of shad was very much better than during the two previous years. Yielding to the earnest solicitation of the Lorneville fishermen, a fall shad fishing season was granted, but was unproductive of result, as the fall run failed to put in appearance. However, that is very unusual. I feel sure that the fall fishing season is going to be very beneficial to the fishermen, without being at all injurious to the fishery, as whatever fish are taken will be those that spawn earlier in the season.

## ALEWIVES

Fifteen thousand cwts. of alewives were taken in St. John county during the year, with a marketed value, of \$31,939. The foreign market for salt alewives is in bad shape, with the result that this fishery is being conducted without profit.

## LOBSTERS

A considerable improvement is to be noticed in the lobster catch as compared with the previous year. The catch this year amounted to 6,022 cwts., against 5,813 cwts. for the previous year. The marketed value of the lobster catch was \$173,969.

I am pleased to report that things are looking somewhat brighter in the fishing industry than they have since the close of the war. The fishermen have gone through a very trying period, with the result that a considerable number have abandoned the industry. The great drawback has been a lack of markets rather than supplies of fish. Market conditions improved very much during the present year, and the earnings of the fishermen were considerably more than during any one of the past few years. Grand Manan Island did exceptionally well. Owing to the failure of the pollock fishery, the line fishermen of Campobello and Deer island did very little, while the weir fishery in that section did very well. The "sale for export" condition in the herring weir licenses is very much appreciated by the weir fishermen, and it ought to produce even better results during the coming year than it did during the present year. The fishermen are confidently looking for a return of prosperity in their industry and, there are many signs pointing in that direction.

## REPORT OF INSPECTOR A. L. BARRY, DISTRICT NO. 2, NEW BRUNSWICK, FOR 1924

This district covers that part of New Brunswick bordering on the bay Chaleur, gulf of St. Lawrence and Northumberland strait, and including counties Restigouche, Gloucester, Northumberland, Kent and strait side of Westmoreland county.

The total marketed value of the fisheries for 1924 was \$3,319,500, as against \$2,850,641 in 1923, an increase of \$468,859. This is a considerable increase and is accounted for mainly by the increased values of salmon and smelt. The fisheries of this district are varied and in some cases, notably that of cod, salmon,

smelt, lobsters and oysters, are very valuable. The following table is interesting as showing the comparison between the catch and value of 1924 to that of the preceding year:—

Kind of Fish	1924		1923	
	Quantity caught	Value marketed	Quantity caught	Value marketed
		\$		\$
Cod.....cwt.	230,032	571,376	264,970	536,004
Herring....."	217,052	200,522	214,926	201,576
Mackerel....."	13,845	49,166	13,455	54,054
Alewives....."	5,630	6,891	17,435	20,552
Bass....."	868	11,520	545	6,109
Salmon....."	30,274	302,901	17,669	194,143
Smelts....."	63,748	841,414	43,062	580,723
Lobsters....."	62,281	1,029,595	67,875	1,106,486
Haddock....."	1,746	3,798	1,741	3,643
Hake and cusk....."	7,622	14,816	4,652	8,810
Trout....."	179	2,360	126	1,642
Eels....."	221	2,050	233	1,783
Tom cod....."	13,375	50,209	10,873	31,587
Clams and quahaugs.....bbl.	9,537	40,678	9,588	28,864
Oysters....."	17,201	103,040	14,574	67,123
Shad.....cwt.	3,224	28,287	1,594	5,861

COD

The increase in the value of the cod fishing may be accounted for by the fact that there was exceptionally favourable weather during the whole of the fishing season. The fishing boats were in operation practically every fishing day during the open season.

HERRING

There is a notable decrease in the value of this fishery although the catch nearly equals that of the year 1923. On the whole the herring fishing was good but on account of the poor market no great effort was made to catch them, and in some cases the fishermen emptied their nets and let the fish go.

MACKEREL

The catch of mackerel was about the same as that of the previous year with an increase in value. These fish were very plentiful but as the market was so poor the preceding year and a number of fishermen had occasioned loss, no great effort was put forth in this direction.

BASS

There is a slight increase in the catch and considerable increase in the value of this fishery during the early part of 1924 but the fishery seems to be a total failure in December of that year. This is probably accounted for by the fact that the extreme low water had caused the fish to ascend the rivers far above the normal fishing grounds in order to meet the fresh water.

SALMON

This is one of the chief fisheries of the district particularly in the Miramichi bay and rivers. The catch was nearly double with a proportionate increase in value. In spite of this fact there seems to be no decrease in the run of these fish but rather the contrary. All along the coast the streams were literally choked with the fall run of salmon ascending to spawn which promises good future conditions in this line of industry. One of the hardest problems the

officers have to contend with is the protection of these fish ascending the streams after the close of the season, as on account of the low water and the large quantities of fish it is very easy for poachers to set an illegal trap in the narrow parts of the streams and take immense quantities in one night.

#### SMELTS

This splendid fish, along with the lobster, occupies the premier place among the fisheries of this district. There was a considerable increase in both the catch and value over the preceding year, but the opening of the season in December has been a great disappointment. The number of fish has not decreased so greatly but the size is so far below normal that as a result the market value is cut nearly one half. It is hoped that the latter part of the fishing season (January and February, 1925) will show an improvement. There was a great increase in the number of nets set for this fishing in December but so far most of the fishermen have occasioned only a loss.

#### LOBSTERS

There was a slight decrease in both the catch and value of the lobster fishery from the preceding year, but the industry still keeps a high level. The number of canneries operating decreased from 177 to 142, but there was a considerable increase in the live lobster industry, which promises to take a more important position year by year. Great improvements have been made in the method of canning of lobsters as also in the methods of shipping them alive. It would seem, however, that the live lobster trade will provide greater protection for these shell-fish than can be obtained by canning, as only lobsters of a certain size are required for shipping alive, whereas the canning factories will accept very small fish.

#### TOM COD

A slight increase is noted in the catch of this fish with a corresponding increase in value.

#### CLAMS AND QUAHAUGS

The catch is practically the same as for 1923 with a slight decrease in value. The quahaug fishing industry has been improved by the erection of a cannery at Shediak. Previously these fish were shipped in shell to the United States and as the greater part of the weight of the fish consists of shell the high freight threw somewhat of a damper on the marketing of this fish. With the starting of local canning a great improvement is expected in this line in future.

#### OYSTERS

There was considerable increase both in catch and value over the preceding year. The oysters taken from the leased areas commanded a particularly high price and are coming more in demand every year on account of their superior quality. As a result some of the fishermen who operate on the public beds are beginning to appreciate the fact that it is better to work for a high standard of quality rather than for quantity production alone.

#### SHAD

The catch and value of shad were more than double over that of 1923.

#### SCALLOPS

Although the department has gone to considerable expense in locating the scallop bed areas along this coast, and some particularly good beds were found off Gloucester county, no great stride has yet been made toward catching this

shell-fish due probably to the fact that the fishermen are not familiar with the methods of fishing. Some inquiries have been received from scallop fishermen in Nova Scotia as to the facilities for marketing these shell-fish from this district and it is hoped that this line of the fisheries will be given more attention in future.

Greater attention seems to be given by the fishermen to the observation of the Fishery Act. The number of prosecutions dropped from 93 in 1923 to 42 in 1924, and the number of confiscations from 142 to 97. The prosecutions were as follows: Illegal fishing, 27; fishing with small mesh, 8; canning lobsters in close season, 2; other violations, 5.

For the protection of the salmon in the Miramichi river (we have over two hundred miles of water open and settled on both sides) a new system of patrolling was instituted in the appointing of what may be called a flying patrol, consisting of two special guardians, who spend their whole time on the river carrying with them their cooking and camping outfit and sleeping on the river bank at night. They cover the districts of all the guardians and work in co-operation with them. This has proved very satisfactory in preventing the taking of large quantities of salmon by means of illegal contrivances of all sorts.

In spite of the fact that there are numerous saw mills on practically all the streams in this district there were no prosecutions for pollution of streams with sawdust or otherwise, and it is worthy of note that this part of the Fishery Regulations is being appreciated and observed.

One matter which will require considerable attention is the destruction by seals at the mouths of the rivers. These marauders prowl about during the early summer and play havoc with the salmon, breaking into and destroying nets, and mutilating the salmon so that they are unfit for market. Suggestions for their destruction are now before the department and it is hoped that some effective method will be found whereby they may be greatly reduced in number if not entirely exterminated.

There was considerable loss to the fishermen in a heavy storm of October 1st in which many lobster traps as well as some small boats were torn away and destroyed. Also running ice in December occasioned a loss of thirty-six smelt nets in the Miramichi district alone; the latter coming on top of a poor smelt fishing year has occasioned considerable hardship. In this hazardous employment only one life was lost during the year.

#### REPORT OF INSPECTOR H. E. HARRISON, DISTRICT No. 3, NEW BRUNSWICK, FOR 1924

District No. 3 comprises the counties of King's, Queen's, Sunbury, York, Carleton, Victoria and Madawaska.

The early season, or winter, fishing was not of sufficient importance to require observations. The covering of ice in some of the rivers and streams began to show signs of decay early in April, and towards the last of the month there was considerable open water in places, and, on the 26th of that month the first fresh alewives, taken in the Oromocto river, near Fredericton, were put on the market here. On the 7th of May the St. John river was all clear of ice and the spring freshet was at its highest point of the season. Very little rain fell for several weeks in this part of the province, but the waters were held at a fair height because of snow gradually melting at the heads of the several rivers, but, by the latter part of June the larger rivers were at a low level, and continued that way until the first of September.

## ALEWIVES

Year	Cwt.	Value
1923.....	875	\$ 2,188
1924.....	668	1,669

It will be observed that while 207 cwt. less alewives were taken in 1924 than during the previous year the value was greater. The smaller value in 1923 was because of the inability of the fishermen to find a market for 153 barrels of salted fish. The lack of a considerable market for salted alewives, taken in the inland waters, is evidently having an effect. Three of the officers reported an excellent run of large fish during the spring. Lack of favourable packing and marketing conditions in the inland district ought to benefit the St. John harbour fishermen, in that their catches ought to be greater within a reasonable period.

and to value for his collection

Year	Cwt.	Value
1923.....	17	\$ 255
1924.....	17	255

The sea, or striped, bass fishery was of little value during the present year, in fact, it has been in that condition for some years.

## MULLETS

Year	Cwt.	Value
1923.....	8	\$ 32
1924.....	120	360

A considerable trade was done in the mullet fishery during the summer of the present year. While 800 pounds were marketed in 1923, the weight mounted to 12,000 pounds during the present year.

There are many streams in my district containing large numbers of this fish, therefore, besides ridding the waters of this more or less nuisance it is possible for the fishermen to make a few dollars.

The catch is practically all shipped to the United States markets, although the Jewish population of the towns and cities of this province consume a percentage of the catch. More or less are always taken in the alewife and pickerel nets, but these are generally thrown away as of no value.

and to value for his collection

Year	Cwt.	Value
1923.....	1,635	\$ 16,350
1924.....	775	7,750

The decrease in the quantity of pickerel taken, compared with 1923, is very marked, but, to a less extent than the increase in 1923 over 1922. In 1923 there was close to 700 per cent increase over the 1922 catch. It may be that pickerel were fished too hard last year. I am inclined to think that local conditions had much to do with it. In 1923 water conditions appeared to be favourable, whereas, the spring freshet of 1924 was not so high, which may have had something to do with it, and the water remained low, and more or less stagnant during the whole of the summer, and the nets do not take so many fish when the waters are dead low. I saw a few of the largest pickerel in the Fredericton market last summer I have ever seen. They were taken in the Oromocto River, and weighed about two pounds each.

## SALMON

Year	Cwt.	Value
1923.....	355	\$ 8,165
1924.....	496	12,400

There was a fairly substantial increase in the amount of salmon taken, being 141 cwts. better than in 1923, and 72 cwts. better than in 1922. A considerable portion of the increase is due to the extended period of two weeks' fishing allowed in the tidal water of the St. John river, and, more particularly to the last week of those two. Practically the whole of the Kings county catch is taken in the St. John river, and the whole of the catch in York county is taken in the St. John. During the first of the two weeks extension I visited some of the salmon fishermen in Kings county and I was told that they had taken about as many salmon that week as they had during the whole of the season previously, but a large per cent of them were grilse, or small salmon (called "fiddlers" in that district), while the catch in York county was much the best of the season during the last of the two weeks' extension, and the fish in the latter case were large, most of them from twelve to twenty pounds each. The extension did not apply to the non-tidal water of the St. John river, consequently, all net fishing ceased beyond the head of tide on the fifteenth of August.

## SHAD

Year	Cwt.	Value
1923.....	792	\$ 4,752
1924.....	1,503	9,018

It is with very great pleasure that I am able to make my report regarding the shad fishery for the present year. The comeback of well up to 100 per cent over the catch of 1923 is very satisfactory, and even shows a betterment of the 1922 figures by 279 cwts. I am not prepared to advance any specific reason for this condition, but I hope that it is at least partly due to sane regulations well enforced. It may be that more shad escaped the nets in St. John harbour, and reached the St. John river and its tributaries, however, I understand that the catch in the harbour was also very satisfactory. It would be within the mark, I think, to say that the Kennebecasis and Washademoak waters produce quite 65 per cent to 70 per cent of the shad taken in this district, and the quantity taken in the non-tidal water of the St. John would not, I think, be more than two or three per cent of the whole. Shad fishing was exceedingly good in the Victoria sub-district this season. Shad are so late in reaching that water (near the Grand falls of the St. John river) that the few men who fish there do not have more than one week's fishing, and, sometimes not more than three nights, before the season closes—June 20.

## STURGEON

Year	Cwt.	Value
1923.....	100	\$ 2,000
1924.....	66	1,650

This fishery fell off considerably from last year—a fraction more than 33 per cent. Those following it laid the cause to the continued low water of the St. John river, and continued heavy winds. I do not know that that is the actual reason, but, these men are experienced fishermen and, in a way close observers. Many of the sturgeon taken were of good size, which is indicated by the amount of caviar produced, as little, or no caviar, is taken from the smaller sturgeon. The quantity of caviar this year is 164 pounds, as compared with 121 pounds in 1923. Both fish and caviar are shipped to dealers in New York, but the fishermen often complain that they do not, or think that they do not, get a square deal. Reports come back that the shipment was not in good condition, or it was delayed in transit, or some such report, and fishermen have to accept such, and take what is sent them in return for fish and caviar.

## EELS

Year	Cwt.	Value
1923.....	Nil	Nil
1924.....	70	\$3 50

In former years, when eels were taken in this district it was from the waters of the lower tributaries of the St. John river, but this year eels were being taken, and in goodly quantities, in the Meductic (or Eel) river. Evidently this river must have been frequented by eels in considerable numbers in olden times, as it has been called "Eel" river since before I can remember. This river is a tributary of the St. John, emptying into the latter twelve miles below the town of Woodstock, Carleton county, and is part of the division line between the counties of York and Carleton. It is 135 miles from the mouth of the St. John River. About fifteen miles (by water) up the Meductic (Eel) river is situated the village of Benton. This village is near the American border, and an American citizen came there this summer and began trapping els, with the result, so he reported to me, that he had taken thirty-five barrels when the eels stopped moving about this fall, for which he got \$10 per barrel, just across the line. He was able to put them there at that price, as the distance is short, probably he, or some other person, will follow this up another year, and I hope that it will be a success, and get at least a few eels out of these waters.

## WHITEFISH

Whitefish appear to have completely disappeared from Baker lake. It is beyond me to account for this condition. Several nets set for whitefish, were seized in this water during the present season, but there were less than one dozen whitefish in all of the nets when seized, which is substantial evidence that the fish are not there at present. During some recent years there has been more than 30 cwt. of whitefish taken from the lake, in one season, and the complete absence of this fish is a considerable loss to the residents of the lake shore. This fish must have descended Baker brook, to the St. John river, as that is the only way of egress.

The total weights and values of the commercial fish taken in this district during the years 1923 and 1924 are as follows:—

Year	Cwt.	Value
1923.....	3,783	\$ 33,924
1924.....	3,715	33,698

## MATERIALS

Year	Cwt.	Value
1923.....		\$ 16,845
1924.....		15,676

## DOMESTIC FISHERIES

Year	Cwt.	Value
1923.....	428	\$ 7,325
1924.....	473	8,845

The domestic fisheries of this district show a fair margin of increase in weight and value over the same of 1923, and equally as good as in 1922, which was considered a very good season.

Trout, generally, appeared to be plentiful, and in many districts trout angling was good. When one considers the numbers of persons who take more or less trout from the different streams that are not too remote from their homes, the wonder is not that some of the better streams become fairly well depleted, but, that there are any trout left in them at all. Probably there is not any question that a certain amount of illegitimate trout fishing is carried on, particularly as regards the number of trout per person per day, and the size

limit. There are some lakes, and many small streams, which contain large numbers of small trout, with apparently few large fish, and the latter appear to know how to take care of themselves. Of course there are hundreds who fish for trout who do not get nearly the limit of ten pounds, or thirty fish per day. I think that there is not any question as to the value of the work of the department in raising and distributing young trout in the different waters. The number of persons applying for both trout and salmon for distribution in the different localities is not very much of an indication as to the number of persons who do, or should, appreciate it, as many persons fish these same streams. Apart from the pleasure trout fishing provides, it is a source of considerable value, particularly in districts where other fish, or fresh meats, are not available during the warmer months.

Salmon angling was fairly satisfactory this year—as good as it was in 1923, but with the scene shifted about some. It will be observed that there is an approximate increase in weight of 30 cwt., as compared with the previous year. This is accounted for by the fact that inspectors are allowed to issue certain permit for taking salmon with rod and line before the 24th day of May. In 1923 Ex-Inspector Crocker (District No. 2) issued some special permits, allowing the holder to take two salmon per day for his own use, if the fish were fit for food. No applications were received by me that year (1923), but the present year some twenty-seven applications were made to me, and permits issued to the applicants free of charge, but the permits I issued allowed only one salmon per day per person, as I think that one salmon is about all any ordinary family could use in a day, particularly if followed up for some days, and, it would appear that it was followed up fairly well, as I had a fishery guard on duty during the period, from the time salmon began to descend the Miramichi river on their way to feeding grounds again, until May 24, when fresh run of salmon are beginning to ascend the river, and this guardian reported that approximately 400 salmon were taken by the early spring anglers in his district, which comprised, at this time, the Miramichi river, in York county, and it is only on a short portion of the river nearest Northumberland county that salmon are taken in the early season. These fish, generally, look fairly good, and they taste somewhat of salmon flavour, and they appear to be appreciated by those taking them, therefore, as long as the matter is under control, probably no harm is being done.

Because of more or less dissatisfaction amongst the salmon anglers of the upper Miramichi waters I was authorized to employ two special fishery guardians for patrol duty on that river in Northumberland county. Two good men were secured in Carleton county, and they spent some weeks in Northumberland county, with very satisfactory results—a considerable amount of illegal fishing materials being destroyed, and, no doubt, the lives of a considerable number of salmon being spared, to reach the spawning grounds later. Salmon angling on the St. John river, at the Hart's Island pool—almost within the limits of the city of Fredericton—was not nearly so good as it was in 1923. Last year (1923) was an exceptional one at this pool, and apparent conditions were not very dissimilar this year, but for some reason, sportsmen could not land their fish this year. It has been suggested that spring freshets are filling, or otherwise changing the channel of the river at this place, and fish are not stopping as they did previously.

Some of these sport fishermen who had such great success in 1923, because they took many fish with little effort, rather commercialized the sport, consequently, they were greatly disappointed because the 1924 catch was not up to that of the previous year. The more "touchy sportsmen" pretended to think

that the pool was not being properly guarded by the fishery officer and guardian, but I can assure you that that was not the case, as officer McNally spent many nights at the pool, and guardian Pitcher was there every night, and stayed until morning.

A report from the Superintendent of the Tobique Salmon Club (which I read) stated that that club had a fairly satisfactory year on the Tobique waters. He further stated that during the spawning season they had the finest lot of large salmon on the beds that he had ever seen there—and he has been there about thirty seasons, I believe. Messrs Ogilvy Brothers, who have very good angling rights on that water, state that their season was not very good, and that about all of the salmon taken by their guests were net-marked.

#### FISHWAYS

Fishways in my district are, in general, in good condition. There are not any in Kings, Queens, or Sunbury counties. A new, or renewed, one is badly needed on the St. Croix waters at Forest City, York county.

#### PROSECUTIONS

Prosecutions during the year numbered twenty-five. These were for water pollution, and other violations of the Act.

Fines collected in 1924 from prosecutions in 1922.....	\$ 120
“ “ “ “ “ 1923.....	70
“ “ “ “ “ 1924.....	570—\$760
Fines imposed in 1924, and suspended.....	270
One case was dismissed by a magistrate.	

#### CONFISCATIONS

Confiscation of illegally used materials during the year number forty-one, twelve of which were of materials seized by my two special guardians who patrolled the non-tidal water of the Miramichi in Northumberland county, working in conjunction with Inspector Barry's officer and guardians in that district.

Approximate value of illegal materials seized in 1924.....	\$ 260
Value of materials seized in 1923 and sold in 1924.....	60
Value of materials seized in 1924 and sold in 1924.....	69
Approximate value of materials (illegal, and useless for sale) seized and destroyed in 1924.....	190

### REPORT OF S. T. GALLANT, INSPECTOR OF FISHERIES, PROVINCE OF PRINCE EDWARD ISLAND AND THE MAGDALEN ISLANDS, FOR THE YEAR 1924.

#### PRINCE EDWARD ISLAND

#### COD

Cod fishing operations usually begin between the 25th and last of May, but it was late in June before any fish were landed, due possibly, to the unusual weather conditions prevailing during the month of May. Fishing, however, continued good during the balance of the season; there was an active demand, with fair prices, and as a result, I am pleased to report a catch of 41,036 cwt. which is an increase of 13,745 cwt. over that of 1923, with a marketed value of \$81,885, or an increase of \$20,490.

#### HAKE AND CUSK

The catch was 15,430 cwt. This is an increase of 4,454 cwt. The marketed value was \$27,081, or an increase of \$6,307.

## HERRING

The catch was 37,716 cwt. This is a decrease of 15,597 cwt. The marketed value was \$58,664, or a decrease of \$18,311. The decrease was no doubt due to the fact that the shore was hemmed in with ice until May 25th.

## MACKEREL

For the first time in twenty years, or so, mackerel hung around the shores all summer and were caught in fair quantities with hook and line. The catch was 7,646 cwt., which is an increase of 4,747 cwt. The marketed value was \$37,448, or an increase of \$19,439.

## SALMON

Some 62 cwt. were taken. This is an increase in the catch of 28 cwt., and an increase in value of \$530. No attempt has been made on the part of the fishermen to develop this important fishery, probably on account of the high cost of equipment, etc. I am looking forward, however, to the time when this fishery will play its part in increasing the revenue of this Province.

## SMELTS

The catch was 14,273 cwt. with a marketed value of \$133,747. There is an increase of 4,489 cwt. and an increase in value of \$12,514.

## EELS

There were 785 cwt. caught, valued at \$7,835. There is an increase of 702 cwt. with an increase in value of \$7,111.

## LOBSTERS

The catch of lobsters was 65,893 cwt., which is a decrease of 31,563 cwt. The marketed value was \$777,301, or a decrease of \$628,605.

No doubt the unusual ice conditions during the month of May were largely responsible for the decrease in the catch; the winter was very mild up to March 12, and as a result no board ice formed. The prevailing winds for the balance of March, April, up to May 20, were northeast, filling up the gulf with heavy northern ice, which, being very heavy grounded in eight and ten fathoms of water. As lobsters during the latter part of April are found in eight to twelve fathoms of water, no doubt the heavy ice scattered the school, and a small catch resulted.

It is pleasing to report, however, that there was a marked increase in the catch in the Late Season district, that is, between West Point and Victoria. It will be observed that only a small percentage of the lobsters caught in the Late Season district are canned, from 60 to 70 per cent being shipped in the shell principally to the United States markets. I am informed by some of the shippers that the mortality in the lobsters shipped alive during the month of August is between 25 and 40 per cent. This is a waste that should be prevented, if at all possible, in fact, it is a matter worthy of the consideration of the shippers who have in mind the furthering of their own interests and the development of the industry as well.

Now that the prospects for the marketing of cod are good it would be well for the fishermen to devote more time to the cod fishery and lessen their efforts so far as lobster fishing is concerned. No doubt the decreased catch of lobsters is a blessing in disguise, for had there been a normal catch the prices would have fallen probably to \$15 a case, and this, considering the high cost of equipment, etc., would have been \$9 or \$10 below the cost of production. It would be well for packers and fishermen to bear in mind the fact that lobsters are being consumed slowly, and, as a result, many of the buyers are left with large quantities of the season's pack still on their hands.

## OYSTERS

There were 7,945 barrels of oysters taken. This is an increase of 3,910 barrels. The marketed value was \$63,840 or an increase of \$23,490.

Operations began under most favourable conditions, the weather being all that could be desired. Large quantities of oysters were landed daily up to November 15; there was a keen demand for the fish and good prices were obtained. After the above date the markets became overstocked, and the prices fell so low that fishing ceased. Had the market continued much larger quantities of oysters could have been taken. East, West Rivers, and tributaries, Orwell, and Vernon rivers are well stocked with small oysters and a good catch is anticipated for next season.

During the summer we had some oysters placed in Richmond bay for observation, and I am pleased to report that in the month of October an examination was made and these fish were found to be in a thriving condition. If these oysters show no sign of blight next season it may be concluded that the disease which has been killing the fish for the last eight years or more has run its course and is a thing of the past.

## FISHERIES PROTECTION SERVICE

Many attempts at illegal lobster fishing were frustrated by the guardians, and some seventeen offenders were cited before the courts and fined.

Total number of prosecutions for various violations of the Fishery Regulations during the year.....	41
Total number of confiscations during the year.....	15

## FISHERIES PROTECTION SERVICE BY PATROL "RICHMOND"

The patrol boat *Richmond* was in charge of Captain Thomas Baglole and Assistant Fred McKinnon, and began patrolling duties on July 10, after being made ready for sea. She continued patrolling until November 29, when she was laid up in her winter quarters at Ellis river. The following seizures of lobster gear were made:—

Year	Rope fath.	Traps	Anchors
1924.....	2,051	300	5
1923.....	1,400	192	7

The captain and his assistant were most zealous in the discharge of their duties, and did all in their power to suppress illegal fishing.

## MAGDALEN ISLANDS

## COD

The demand for cod, which is at present world-wide, is very encouraging to those engaged in this fishery. The catch was 53,144 cwt. with a marketed value of \$153,141, which is an increase of 21,218 cwt. and \$97,670 in value.

## HERRING

There were 119,748 cwt. taken. This is an increase of 4,876 cwt. The marketed value was \$77,006, or an increase of \$2,895. In former years this fishery was an important item of revenue to the fishermen, as a large number of fishing vessels usually procured their bait at this point during the fishing season, but of late years this practice has been discontinued.

## MACKEREL

Some 37,515 cwt. of these fish were taken. This is an increase of 924 cwt. The marketed value was \$121,588 or an increase of \$32,593. The method of curing mackerel has greatly improved during the last two years, and the quality of the fish is now much better than in the past. It is a pity that spring net-mackerel cannot be sold fresh, as they are too thin for salting, and can command only a very low price. Proper means of transportation prevents shipping them fresh.

## LOBSTERS

The catch was 17,605 cwt. which is a decrease of 12,376 cwt. The marketed value was \$223,123 or a decrease of \$220,498. The same weather conditions prevailed as in the other Provinces, hence the same percentage of decrease.

## REMARKS

Means of transportation by boats has been opened between House harbour and Grand entry through what is known as a lagoon. Dredging at this point was carried on with great success. This was a longfelt want and the people are loud in their praises of the Government for having afforded them this means of communication. As every man, woman, and child on these islands depend largely on fishing for a livelihood, any improvements which can be effected to lighten the burden of these good, law-abiding citizens will be greatly appreciated.

## REPORT OF J. B. SKAPTASON, INSPECTOR OF FISHERIES, PROVINCE OF MANITOBA, FOR 1924

The year 1924 shows an increase in the total commercial catch for the province of 23,808 cwt. of all fish, and an increased market value of \$211,968. The figures are as follows:—

1923		1924	
Quantity	Market value	Quantity	Market value
cwt.	\$	cwt.	\$
154,090	1,020,595	177,898	1,232,563

It will be seen the prices realized per pound average practically the same for the two years. 1924 prices, however, have been somewhat higher for the better grades of fish, whitefish and pickerel, while the cheaper grades, such as tullibee, pike and goldeyes, all show a considerable drop. The increased output is accounted for by nearly 300 additional operators as compared with 1923.

## MARKETS

Market conditions on the whole may be said to have been favourable during the entire year. The only exception being tullibee. During the winter season of 1923-24 prices were low and the demand poor. The present season 1924-25 even worse conditions threaten the operators. At present there is no demand for tullibee at any price.

The following are comparative prices of the chief or most important varieties of commercial fish as marketed in the last two years:—

	1923	1924
Catfish..... per pound	10-0	11-1
Goideyes..... "	5-0	4-4
Perch..... "	8-6	10-6
Pickereel..... "	8-4	8-5
Pike..... "	3-7	3-5
Saugers..... "	5-0	5-3
Sturgeon..... "	47-3	50-0
Trout..... "	7-5	10-0
Tullibee..... "	5-5	3-6
Whites..... "	7-1	9-7

*The Pas*, Sub-District comprising all the waters north of the 53 parallel excepting the waters of lake Winnipegosis.

The winter fishing is much the same as the previous year, while the summer operations were considerably more extensive. On the Big Saskatchewan river the summer sturgeon operations produced only 36,000 pounds, as against 65,000 pounds the year before. The cause of this difference cannot reasonably be attributed to a falling-off in the catch. In 1923 there was keen competition amongst the buyers, and prices were run up to an unprecedented figure. This year the competition has been eliminated, also the velvety prices to the fishermen, resulting in only a few men going out. The catch per man, however, averaged slightly better than 1923.

Quite extensive operations were carried on in the Nelson river and its water expansions. The Armstrong Independent Fisheries operating on the lower reaches of the river with headquarters at Mile 239 on the Hudson Bay Railway, which is near Manitou rapids, put up a new ice house and freezer at this point last year. Their operations extended as far down the river as Kettle rapids, where an icehouse has also been built. This company had taken 89,000 pounds by August 9, when all fishing was stopped as the limit for the river was reached. The Purvis Bros. fishing in the upper river or Playgreen lake took 16,000 pounds.

The Armstrong catch was brought out by the Hudson Bay Railway to The Pas, while the Purvis Bros.' fish was taken out by Warrens landing to Selkirk.

The average weight of the sturgeon was 22 pounds. This is slightly better than during the previous year.

Much more caviar was taken than in 1923. This may be attributed to the late season which would result in a correspondingly later spawning of the fish. Some whitefish was taken by both the above operators, 11,000 pounds being caught by the Armstrong Company from Clearwater lake. This was a splendid quality of whitefish, averaging five pounds in weight. The Purvis Bros. took 51,000 pounds out of Big Grass lake in five weeks' fishing, also a good quality of fish.

Winter sturgeon fishing on the Churchill river was undertaken during the present season for the first time. The Booth Canadian Company and the Armstrong Independent each sent in a few men. Overseer Stevenson has just returned from a patrol of that part of his district and reports the enterprise only fairly successful. One outfit secured about 400 sturgeon averaging fully 25 pounds. This was taken at or near the Saskatchewan boundary and may be looked upon as a successful venture, as much of the time was taken up in locating the fish. The other outfit was not nearly as energetic or successful.

*Lake Winnipegosis.*—This lake has not been summer fished for whitefish during the last two summers. The year shows an increase in the catch of whites of 1,844 cwt., while the output of pickerel again is decreased by 5,527 cwt. Many of the fishermen and companies operating on the lake are coming to the conclusion that the lake will not support both summer and winter fishing, and that the time must come soon when the lake will have to be closed again for all summer fishing. The report shows 798 cwt. of tullibee as against 20 cwt. for 1923. This specie has hardly been known in the lake until the last two years, and during the present season, when it is considered that the smallest mesh used on the lake is 4½ inches, the 798 cwt caught may be considered quite a run.

The destruction of mullets was again carried on in the streams running into lake Winnipegosis. This work was in charge of S. J. Walker, Hatchery Inspector. The work this year was on contract basis, the fishermen being paid 1 cent apiece for the fish; 750,000 suckers were destroyed this way.

In connection with this work, such ripe Jacks (pike) as were running up streams in amongst the suckers, were stripped, the eggs fertilized, and several millions distributed and placed in small lakes in Manitoba and Saskatchewan.

*Lake Manitoba* shows a general increase in production of all varieties of fish. This, with the exception of the increase in tullibee, is accounted for by the increased number of men fishing. It is a very notable thing, the way this lake supports the tremendous drain it has been subjected to the last few years, without any artificial propagation of any of its fishes. During the past two winters approximately half the winter fishermen of the province have been operating on lake Manitoba. The tremendous tullibee production resulting in an increase from 3,900 cwt. in 1923, to 19,742 cwt. 1924, is unprecedented in the history of the lake. This catch was all made within two weeks of freeze up, the fall of 1924.

*Lake St. Martin* shows up much better than any of the past years. A good run of whitefish found its way up the Dauphin river in September and October.

*Lake Winnipeg.*—The summer season for whitefish (1st of June to 15th August) was very disappointing. With a limit of 3,000,000 pounds, only 1,456,700 were taken. This is a decrease from the previous year. The following are the figures for the last four summer seasons:—

1921	1922	1923	1924
2,966,000 lbs.	2,472,470 lbs.	1,523,800 lbs.	1,456,700 lbs.

In my 1923 report I made mention of increased catches of whitefish during the fall pickerel season on the inner or south part of the lake. I am glad to be able to report now, that this increase was even more marked during the fall fishing of 1924. Periods of the season produced whitefish aggregating from 10 per cent to 50 per cent as against pickerel. This is in the area of the lake from Black Bear island to the south end. Some years ago these waters had absolutely no whitefish, and it is in the last few years that a steady increase has been observed. This as I have previously reported, is generally attributed to the Gull Harbour hatchery.

The pickerel catch was much lighter for the past winter season than the immediately preceding one, the decrease amounting to approximately 40 per cent.

The sturgeon operations carried on in the vicinity of Pigeon river and the Winnipeg river show an increase in production fully in accord with the increased number of fishermen engaged, which would indicate no apparent depletion so far in these areas.

Stocking of small lakes in the southern and western areas of the province has been most energetically carried on by the officers of the district. The C.G.S. *Bradbury* made two trips from Gull harbour to Selkirk with pickerel fry hatched at the hatchery.

The lakes in the Turtle mountains have been stocked for several years now, with the results that pickerel have become so plentiful in them, it is considered by the forestry officer in charge of the area, that further stocking would not be beneficial.

During the year there were 36 prosecutions in the province for violations of the Fishery Regulations:

- 20 for use of illegal nets,
- 11 for fishing without license,
  - 1 for having fish illegally in possession,
  - 1 for fishing in prohibited area at St. Andrews locks,
  - 1 for using illegal contrivance,
  - 1 for fishing in closed season,
  - 1 for interference with a fishery officer.

Convictions were obtained in all instances excepting the last. One conviction was appealed and lost by default, the department's lawyer neglecting to appear.

Revenue from fines.....	\$ 684 00
Revenue sales of confiscated articles.....	807 84
	<hr/>
	\$ 1,491 84

## REPORT OF G. C. MCDONALD, INSPECTOR OF FISHERIES, PROVINCE OF SASKATCEWAN, FOR 1924

A total catch of 60,685 cwts., of all kinds of fish was taken during the year in the province. This is an increase over the previous year of 22,921 cwts., and is due to the increase in the number of fishermen operating, as well as to the ideal weather conditions during the opening of the winter fishing season, when fishermen were able to commence operations on the first day of the open season. The statistics for the Peter Pond district are also included in this province for the first time, and account for a large part of the increase.

### WINTER SEASON

A total catch of 55,461 cwts. of all kinds of fish was taken during the winter season. This is an increase over the previous winter season of 33,076 cwts.

### SUMMER SEASON

There is a total catch of all kinds of fish during the summer season of 5,224 cwts. This is an increase of 536 cwts. over the previous summer season, due to more men operating and the reopening of Lowes lake to summer fishing.

### MARKETS

The market value of all fish produced commercially during the year is \$482,-492. This is an increase over the previous year of \$195,849 and is due largely to the increase in production and also to the increased quantity of green fish marketed during the winter season. There has been keener competition among fish buyers and increased demand. The local markets have been well looked after by the dealers and no complaints have been received regarding a shortage of fish for local trade.

### LICENSES

During the year there were 812 commercial fishermen licenses issued, being an increase of 224 over the previous year. This increase is partly due to the poor crop conditions in some districts as well as to the increased demand for fish.

## EQUIPMENT

The total value of equipment used during the year was \$79,472, an increase of \$27,816 over the previous year. There being an increase of 925 gill-nets, 12 hoop-nets, 4 lines, 11 piers, 20 ice houses, 41 row boats and 21 gas boats. Of this increase on Lowes lake there were 8 piers, 11 ice houses, 33 row boats and 16 gas boats, due to the opening of that lake for summer fishing. The balance of the increase was on Jackfish, Turtle and Worthington lakes, where considerable summer operations were carried on.

## FISHWAYS AND DAMS

During the year new fishways were constructed in the dam on the Turtle river near Mervin and in the dam on the Stoney creek near Melfort. The dam on the Red river near Red Wing and the one on the Carrot river near Kinistino were removed by the owners as they were no longer required. Other fishways are reported to be serviceable except that in the dam at the north end of Crooket lake, which is in poor condition and is receiving attention.

## CONDITION OF FISHERIES

There are no waters showing any immediate signs of depletion that would require any further special restrictions except probably Okemasis and Jackfish lakes which are both fished considerably during both summer and winter seasons owing to their proximity to the railroad. These two lakes were, however, replenished during the past summer with whitefish fry from the hatchery.

## DOMESTIC FISHING

A total catch of 14,641 cwts., of all kinds of fish was taken during the year under domestic license. This is an increase over the previous year of 4,649 cwts., of which whitefish account for 939 cwts.; trout, 30 cwts.; pike, 2,806 cwts.; with a corresponding increase in the other coarser species. This increase in catch is due to there being an increase in the number of domestic licenses issued of 159; as during the year there were 932 licenses issued, against 773 the previous year. The total catch per license is about 1,571 pounds, compared with 1,293 the previous year.

## ANGLERS

During the year it is estimated there was taken 23,048 cwts. of fish by anglers. This is an increase of 8,124 cwts. over the previous year. There is an increase of 12,123 anglers over 1923. The average catch per angler during the year was 63 pounds of fish each, compared with 60½ pounds in 1923. Angling is increasing from year to year due partly to the more remote waters being opened up by better trails leading to them. In a short time it may be found necessary to curtail commercial operations on some of these, especially those containing lake trout, which are now attracting the anglers. During the present year the regulations have been amended making it now necessary for non-residents to first obtain an angler's permit to fish in our waters, with the result that 376 angler's permits were issued during the year 1924.

## REGULATIONS

During the year there were ninety-six prosecutions in the province and a conviction secured in all cases except three, resulting in fines amounting to \$657 being imposed with additional costs to the defendants of \$359.45, as follows:—

Fishing during the closed season.....	43
Fishing with illegal apparatus.....	30
Illegal possession of fish.....	7
Fishing without license.....	4
Fishing with excess of nets.....	4
Fishing to excess under free permit.....	2
Obstructing a fishery officer.....	2
Pollution of waters.....	1
	<hr/> 93

There were also ninety-five confiscations made during the year.—

Of illegal apparatus.....	29
Of legal apparatus.....	26
Of illegally caught fish.....	40
	<hr/> 95

There were forty-seven sales of confiscated articles made, amounting to \$801.23.

## REPORT OF R. T. TODD, INSPECTOR OF FISHERIES, PROVINCE OF ALBERTA, FOR 1924

*Increases (Summer Season).—*A slight increase is to be noticed in the Cold lake district for the summer season chiefly due to the coarser varieties caught in Moose lake where more extensive operations were carried on. Trout show a decrease through the limit placed on Cold lake having been reached. A further increase in Wabamun lake is reported, the fish marketed being of an excellent variety and good prices were obtained throughout the summer. This lake is now considered as being well stocked and in a healthy condition. Fawcett lake lying in the Athabasca district, was fished for the first time in the summer season and an excellent quality of whitefish was obtained and successfully transported via the Athabasca river in boats to Smith on the Edmonton and Dunvegan Railway where the catch was reiced. The operation was a decided success and the fish marketed profitably and in a good condition.

*Increases (Winter Season).—*Cold and Primrose lakes show large increases in the winter season January 1 to February 15, and this is accounted for by a greater number of fishermen and larger operations. The winter season commencing December 1 shows a marked decrease, and overproduction has depleted these lakes. These lakes have a limit now placed on the catch, and it is doubtful if this limit will be reached at Primrose lake.

Trout and Peerless lakes situated in the Lesser Slave lake district account for large increases. The fishing particularly for trout was exceptionally good. I account for this by the fact that the lakes have not been fished to any great extent for the last four years and have therefore been able to recuperate from the heavy fishing of 1918-19. The Lac la Biche district shows an increase over that of 1923, Lac la Biche itself was fished for the first time for some years during the winter season accounting for the increase. The fishing at this lake was, however, very poor, and a few fishermen made even expenses. Pigeon lake continues to increase through larger operations owing to its close proximity to the larger centres in Alberta. The fishermen are able to market the fish locally and profitably.

*Decreases (Summer season).—*Lac la Biche district reports a decrease where fishing was both poor and unprofitable in pickerel and whitefish. The waters of northern Alberta are exceptionally low which may account in part for the

unsatisfactory fishing, and possibly in part from the fact that owing to their close proximity to the railways these lakes are being overfished. Lesser Slave lake shows a serious decrease over that of 1923. Exhaustive reports have been forwarded to the department and the very closest watch has been kept on conditions at this lake during the entire year. Briefly it is concluded that the decrease is through heavy fishing, larger operations and better equipment of the companies operating. Rough weather and a later opening of the season contributed to the above-mentioned decrease. Fishing at this lake during the winter was on a very small scale, and a decrease is noticed also in this season's fishing. A poor market for coarse fish discouraged the fishery at Lesser Slave lake during the past winter.

#### MARKETS

The market during the year 1924 was very unstable and quantities of whitefish were carried in cold storage until the fall season. Operations at Lesser Slave lake during the summer season, at the commencement, operated without a profit and in some cases at a loss. Towards the end of the season better prices prevailed. Filleted fish exported by the Menzies Fish Company from a new refrigerator plant at Faust, however, brought excellent prices in the fall, as high as 25 cents per pound being obtained. Winter prices have been low and although fishing has been poor there is still a great quantity of frozen fish on hand. It would appear that other markets must be obtained before any further development may be expected in the fisheries of this province. A new development has been successfully accomplished, that of shipping fish unfrozen, and during this present season four carloads were shipped and the prices paid average from 12 to 25 cents per pound. A greater development in this may be expected during the coming year.

#### EQUIPMENT

Equipment such as nets, etc., are much the same as last year but with a greater number of gill-nets in use. At Lesser Slave lake a new refrigerator plant was built with a capacity of 150,000 pounds and a value of \$4,000. This has proved to be a financial success and larger operations are contemplated. Two new gasoline launches were used this year on Lesser Slave lake. At Widewater, on Lesser Slave lake, fishermen are erecting a new ice-house where a number of them intend to co-operate and ship their fish direct to Chicago thus eliminating the middleman.

#### OBSERVANCE OF THE REGULATIONS

*Prosecutions and Confiscations.*—There were twenty-three successful prosecutions and twenty confiscations during the year 1924. One of these prosecutions was for the pollution of waters and several offenders were given time in order to clear débris, millwaste, etc. This was chiefly on the Saskatchewan river at Edmonton. The observance of the regulations was this year closely watched and offenders were immediately dealt with. On the whole it would seem that the general public and sportsmen are alive to the question of the conservation of sporting fish and commercial through the successful carrying out and the observance of the Fisheries Regulations:—

5	Prosecutions under Section 27 (fishing with apparatus other than gill-nets).
8	" " " 1 and 32 (fishing without licenses or permits).
4	" " " 20 (fishing in close seasons).
2	" " " 34 (undersized fish).
1	" " " 44 (pollution of stream).
1	" " " 17 (fishing with illegal mesh).
2	" " " 77 (fishing in closed waters).

23 Total.

## DAMS AND FISHWAYS

A new fishway was built in the Canadian National Railways dam on the Blindman river at Burbank, and one on the Pembina river near Whitecourt. Both of these dams were built under the supervision of Overseer Mills and are reported as functioning properly. The sewage disposal plant of the Provincial Insane Asylum at Ponoka has been completed at an additional cost of nearly \$7,000. No sewage is now passing into the Battle river untreated.

The Lethbridge Northern Irrigation Company has been instructed and has agreed to build a fishway at the headgates of their canal on the Old Man river, west of McLeod. The Canadian Pacific Railway have repaired their fishway on the dam at the headgates of their Southern Alberta Irrigation canal on the St. Mary's river at Kimball near the international boundary.

## EXAMINATION AND STOCKING OF LAKES AND STREAMS

During the month of May, pike were transferred from Buffalo lake to Little Fish lake, a distance of approximately 125 miles with very good success. Tod creek, a tributary of the Old Man river was inspected with view to closing and restocking. Altogether twenty-eight lakes were examined during the year with view to stocking, some were found to be unsuitable for any species, some were found suitable, while others did not require stocking. Eight lakes were examined to determine the species of fish found therein, whether they should be classed as whitefish or coarse fish lakes. Five lakes were inspected and detailed reports made regarding conditions, with recommendations as to restriction of fishing, etc. Investigations of perch fishing at Lesser Slave lake was carried on by Overseer Travers for several weeks. Investigations during the winter fishing season has shown that species of whitefish found in Battle, McLeod and Sturgeon lake spawn late in December to the 1st of February. I would classify these fish as *Coregonus Labradoricus* (Labrador Whitefish). They are very large some going as high as 11 pounds in weight in McLeod lake. Large whitefish are also being found in Pigeon lake this winter for the first time on record but they are the common whitefish and were through spawning before the season opened.

## ANGLING

Overseer Holmes reports that the angling throughout his district was good this season, except during the wet season when the streams were high and muddy. He states the catch in some streams were high, 50 per cent being Rainbow trout up to one pound in weight. Overseer D. A. Richardson also reports that the angling in his district was the most successful that he has known. It was better in the Bow river this year than for the last ten years. Rainbow trout have been caught in the Jumping pond and considerable numbers have been noticed in Pekisko creek. Rainbow trout measuring 14 inches were further caught in the main Highwood river. I might state that all such trout found in these districts are due to the stocking carried on from the Banff hatchery during the last few years. Very little angling for trout is carried on in the Red Deer and Saskatchewan rivers and their tributaries as only Dolly Varden trout are found. There are a number of very fine trout streams tributary to the Athabasca river, where Rainbow trout are found, but these streams were badly depleted during the construction of the Grand Trunk Pacific Railway and the Canadian Northern and have been so heavily fished since that the fish have very little chance to increase. These streams could be stocked very easily should a hatchery be constructed at Jasper Park. Trolling for lake trout at Cold lake this last season has been extremely good and has afforded good sport for a number of fishermen. 3,942 angling permits were sold during the year, an increase of 668 over last season, 108 being sold at Cold lake by the fishery overseer

REPORT OF CHIEF INSPECTOR MAJOR J. A. MOTHERWELL,  
WESTERN FISHERIES DIVISION (BRITISH COLUMBIA), FOR  
1924.

SALMON

The year 1924 has been an unusually successful one from the standpoint of catch. An examination of statement No. 1 appended hereto shows that the pack of all varieties combined was the largest on record and exceeds that of the previous record year of 1918 by 131,348 cases and last year by 405,828 cases. A particularly gratifying feature is the splendid pack of sockeye, the most sought after variety. The quantity put up has not been exceeded since 1915 in spite of the fact that since 1913 the Fraser river has ceased to be the large factor as far as sockeye are concerned.

It is interesting to note in connection with this variety of salmon that the large production during the year was the result of a smaller quantity of fishing equipment. The very great proportion of the catch is taken by means of gill-nets and the number of these was the smallest in many years and was 261 less than in 1923.

The quantity of pink salmon was 657,561 cases which constitutes a record for this variety. The previous largest pack was in 1922 but this was exceeded by 75,582 cases.

The total of 570,497 cases of chums exceeded the previous record pack of 1918 by 72,882 cases.

The figures with regard to the pinks and chums, however, cannot be safely taken as any criterion of the size of the runs in the several years. Market conditions have a very great deal to do with determining the quantities of these species taken. In the case of the sockeye, however, the figures quoted can be accepted as showing fairly accurately the history of the runs owing to the fact that this variety has always been in demand and every effort is made to put as large a pack as is possible.

Statement No. 2 shows the pack figures for the Naas river and it will be observed that the sockeyes total 33,590 cases, which has not been equalled since 1915. This year being that of the big run of pinks the total shows that the pack of the corresponding year 1922 was almost equalled.

The Skeena river, statement No. 3, will be found very interesting and shows the satisfactory way in which the supply of salmon is being maintained. According to Dr. Gilbert, in the run of sockeye to this river the four and five year fish predominate. An average of the runs of four and five years ago gives a pack of 137,907 cases, which has been exceeded this year by 6,825 cases. The average number of gill-nets fished in the Skeena river during 1919 and 1920 was 1,053 but during this year only 941 were operated. The quantity of sockeye taken together with the most gratifying conditions on the spawning beds proves beyond a doubt that the conservation measures employed in the district are entirely adequate.

By reference to statement No. 4 it will be observed that 91,764 cases of sockeye were canned at Rivers and Smiths inlets although including those caught in these inlets and canned outside, the pack would show as 101,808 cases. The number of gill-nets operating was 963 compared with 1,172 in 1923 when 118,502 cases were packed and 1,044 in 1920 when 142,793 cases were packed.

The condition of the spawning areas in the Rivers Inlet district was found to be eminently satisfactory, all the streams being crowded with spawning sockeye salmon. Here again there would appear to be no reason for pessimism as to the future supply.

Statement No. 5 covers conditions in the Fraser River district. It will be observed that although 209,050 cases of all varieties were packed in this district

only 118,241 cases were actually caught in the Fraser river area, the remainder being brought in from District No. 3.

The quantity of sockeye caught amount to 36,200 cases which, while up to the average of the previous six years is not encouraging in view of the average packs for corresponding years previous to 1913.

The run of sockeye to the spawning areas below Hells Gate, however, was well maintained and there would appear to be little reason to expect that the annual pack will be further reduced as long as conditions in Puget sound, state of Washington, do not warrant the fishing there of the large amount of equipment which was operated before the depletion of the big runs.

This was the "off" year for pinks in the Fraser which accounts for the very small pack of district fish although it will be observed that a considerable quantity was brought in from outside points and canned in District No. 1.

Owing to the fact that the sockeye running to the Fraser river have to run the gauntlet of the traps and seines in Puget sound a statement of the pack in that district is of interest and will be found, numbered 6.

#### SALMON—DRYSALTING

The market for dry salted chum salmon in the Orient was fairly attractive during the year and 7,403 tons of this product were exported to Japan. The fish are prepared in a quite crude way, their heads being taken off and the entrails removed, after which they are heavily salted and stacked in piles. After standing in this way until the salt has had an opportunity to sufficiently cure the fish they are packed in boxes containing approximately 400 pounds each and shipped overseas. It is interesting to note that the quantity mentioned above would have produced 200,000 cases of canned salmon.

#### SALMON—TROLLING

Owing to weather conditions the trolling for spring salmon and cohoes was not as productive as was expected. Fair prices were obtained, however, by the fishermen and such conditions will no doubt always obtain in view of the competition on the west coast of Vancouver island particularly from American buyers. There is absolutely no necessity for a close season regulation as conservation is taken care of by the weather.

#### SALMON—GENERAL

In conclusion I would reiterate the opinion expressed in last year's report to the effect that with the existing regulations, coupled with fish cultural operations as carried on by the department in the province, there need be no fear for the future of the salmon industry.

#### HALIBUT

The fishing operations during the year covered ten and one-half months instead of twelve as heretofore owing to the close season for halibut fishing coming into effect on November 15. It extends to February 15, or a total of three months, which covers the winter fishing. Notwithstanding the shorter season a very large catch was taken which amounted to 330,591 cwt. This quantity has only been exceeded in the year 1923 when 344,667 cwt. were taken. As suggested by Mr. J. P. Babcock, the Chairman of the International Halibut Commission, if there is no reduction in the annual catch in spite of the closed period the results from a standpoint of conservation of supply may leave something to be desired. In the efforts of the cold storage firms to provide halibut in the eastern markets during the three months in which there are no fish being delivered, their plants were filled with frozen fish and if the markets demand

the same quantity of halibut each year and are satisfied with either the fresh or frozen product during the closed period there will be little likelihood of reducing the annual catch. However, the first year will no doubt demonstrate whether the markets will be satisfied with other than the freshly iced.

Elsewhere in this publication appears information with regard to the International Halibut Treaty, the want of which has been felt so keenly for so many years. Without a doubt the halibut supply was rapidly becoming depleted and it is evident that some drastic action was imperative if this immense natural resource was to be saved. On every hand from the fishermen themselves and from others interested in the industry one hears expressions of the greatest gratification at the going into effect of the Halibut Treaty.

The record price of 23.6 cents per pound was paid in October for American caught fish. The previous high record was in October, 1923, when 23.1 cents was paid.

Statement No. 7 gives the landings of halibut in British Columbia from 1913 to 1924.

#### HERRING

Apart from limited seining operations in the vicinity of Prince Rupert for the purpose of obtaining halibut bait, the bulk of the operations are confined to the Barclay sound area on the west coast of Vancouver island and the east coast of the island between Nanoose bay and Cowichan bay. There was an unusually heavy run to both these districts during the year and the dry salt pack particularly showed a very considerable increase as will be observed from the following statement giving the packs from 1918 to 1924 inclusive:—

Year	District No. 1	District No. 2	District No. 3		Total
			East Coast	West Coast	
	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
1918.....	20,000	Nil	109,900	42,710	172,610
1919.....	4,000	Nil	43,000	208,058	255,058
1920.....	807	1	176,640	334,720	512,168
1921.....	249	Nil	231,240	248,482	479,971
1922.....	Nil	Nil	297,871	224,897	522,768
1923.....	Nil	8,935	250,420	484,681	744,036
1924.....	Nil	Nil	305,266	548,277	853,543

In view of the policy of the department looking to the elimination of the Orientals the industry should be totally in the hands of the white population and Canadian Indians by 1927.

#### PILCHARDS

There were 14,898 cases of pilchards canned during the year and these operations were confined to the west coast of Vancouver island. During recent years owing to market conditions there has been little encouragement for putting up large packs of this variety. In view of the enormous quantities which run to the waters of the west coast of Vancouver island and the fact that so little use can be made of them by canning or curing it has been requested by operators that they be allowed to use pilchards in the reduction works plants for the purpose of manufacture into fish meal, fish oil, and fertilizer.

#### WHALING

The three whaling stations operated, two in the Queen Charlotte islands and one on the west coast of Vancouver island, were not quite as successful as

during 1923, taking 415 whales of all varieties against 455 the year previous. The following statement shows the varieties:—

Variety	Kyuquot	Rose Hbr.	Naden Hbr.	Total
Sperm.....	19	52	12	83
Sulphur.....	17	26	13	56
Fin.....	48	46	41	125
Hump.....	19	25	3	47
Sei.....	48	50	2	100
Gray.....		1		1
Bottlenose.....		1		1
Right.....			2	2
<b>Totals.....</b>	<b>141</b>	<b>201</b>	<b>73</b>	<b>415</b>

#### FUR SEALS

The number of fur seal skins taken by the Indians as the herds were on their way north to the Pribilof islands and cleared through the customs at British Columbia ports at Vancouver, Victoria, and Prince Rupert, amounted to 2,232. Under the Pelagic Sealing Treaty it is only the Indians who are permitted to hunt these mammals and then only by means of spears used from canoes propelled entirely by means of oars, paddles or sails and manned by not more than five persons each.

The prices for the fur seal skins averaged approximately \$10, compared to \$15 the previous year.

#### DESTRUCTION OF SEA LIONS

The work of reducing the number of sea lions which have been the cause of so much loss to the fishermen in the Rivers inlet and Smiths inlet districts in past years was continued in the spring of this year. The C.G.S. *Givenchy* was again utilized and weather conditions being found more favourable than usual it was possible to land conveniently on the barren rocks and reefs where sea lions were most plentiful and great execution was done. The expedition was timed for the middle of the pupping season.

Landings were made on the Virgin Islands on June 1, 8, 9 and 10, and on the Pearl islands on June 8 and 10. As usual a Lewis gun was used as well as .44 calibre Winchester rifles and .22 calibre automatic pistols. The total number of lions killed during the hunting was 2,706, compared with 1885 in 1923 and 220 in 1922.

It is interesting to observe the attitude of the fishermen and cannerymen in the districts which have been benefited by the sea lion hunt. These did not hesitate to express in the warmest terms possible their appreciation of the department's action and their attitude was the result of the previous two years' experience in fishing which demonstrated beyond a doubt that much money was being saved to the fishermen themselves and the cannerymen. It is stated by the fishermen that previous to the department's sea lion hunts the gill-nets damaged by these mammals in Rivers inlet during the fishing season had amounted to as many as eight or 10 per week whereas this damage had been reduced to two per week. Undoubtedly these operations are well justified.

#### PATROL SERVICE

There were seventy-five boats of various sizes used in the Fisheries Patrol Service during the year including the trawlers *Malaspina* and *Givenchy*, and the oil burner *Marfish*. Twenty-two of these are owned by the department and the remaining fifty-three were chartered for such periods as required to supervise the fisheries in districts in which they were employed. In addition there were two seaplanes operating out of Prince Rupert.

During the year the *Malaspina* logged 18,404 miles, and the *Givenchy* 14,253 miles. The work performed by these boats included the protection of the three-mile limit against poaching from foreign fishing boats particularly in connection with the halibut industry. Protection was given the fur seals from the time they reached the waters opposite the British Columbia shore until they had passed beyond the boundary line on the north on their way to the Pribilof islands. Further duties consisted of the planting of eyed sockeye salmon eggs in a number of streams and lakes along the coast, the usual annual sea lion hunt, which during the last year was unusually successful, a close patrol of the salmon seining areas which becomes more and more necessary each year owing to the greater number of seine boats operating as a result of cheaper licenses, and the better demand for all varieties of salmon. Assistance was rendered the Customs and Post Office Departments in transferring their officers from point to point and in assisting in the enforcement of regulations in connection with the liquor traffic. One of these boats was also used by the chief inspector travelling about the coast making inspections of the different fishing establishments and in the general course of his inspection work. The *Givenchy* was employed for several weeks at the first of the year and the last two weeks at the end of the year in life saving duties on the west coast of Vancouver island, being stationed at Bamfield.

The two seaplanes consumed 152 hours 8 minutes actual flying time. The results obtained fully justify continuing this method of patrol. Unfortunately during the year it was found that the planes were poorly engined and as a consequence did not give as good service as would otherwise have been the case. However, it is understood that this condition is being rectified before the coming season. Considerable photographic work was done in the course of the patrol. The information in this way obtained will undoubtedly be of great value in the inspection of spawning areas and in planning the restocking of areas requiring attention. With the assistance of the numerous photographs it should be possible to reduce the expense of surveys, the pictures showing in many cases whether it would or would not be advisable to incur the expense of sending parties in for the purpose of examination.

In such districts as the south east coast of Queen Charlotte islands where the waters are not charted and where there are no settlements which could be used as headquarters for patrol boats, the only really efficient patrol which can be provided is that by means of the seaplanes, and in view of the more intensive fishing for the fall varieties of salmon such a patrol is becoming more and more imperative.

The two sixty-foot patrol boats built during the year equipped with semi-Diesel engines have proved extremely satisfactory and undoubtedly justify their construction. These were designed by Engineer Allen after several years of experience in looking after the repairs of the patrol boats in British Columbia, and after his observations of the style of boat which would provide the most efficient patrol at the least expense.

#### REGULATIONS

The enforcement of the regulations during the year resulted in ninety-two prosecutions with eighty-three convictions. The sum of \$2,242.19 was received as the proceeds of fines and sales of confiscated articles.

On the whole the regulations were fairly well observed but in view of the intensive fishing for the fall varieties of salmon it is becoming more and more difficult to provide an efficient patrol of the numerous salmon streams in the province.

Much difficulty is experienced in revising the angling regulations in such a manner as will suit all varieties of fishing in the numerous angling waters. Particular attention during the year has been given to these difficulties and while in a sparsely settled province such as British Columbia there are many difficulties being encountered yet satisfactory results are being obtained. The advisability of the departmental officers working closely with the numerous angling associations has been surely demonstrated.

#### REDUCTION IN ORIENTALS

By reference to statement No. 8 some very interesting facts will be observed with regard to the effect of the department's policy in the elimination of the Oriental from the fisheries of the province. The statement covers the period since the first reductions were made. It is shown that although there has been a reduction made by the department of 40 per cent in the Oriental salmon gill-net licenses issued there was actually a decrease of 1.8 per cent in whites but an increase of 4.1 per cent in Indian licenses. A closer inspection shows that in District No. 1 the whites increased 2.8 per cent and the Indians 32.3 per cent. On the Skeena river there has been an increase of 56 per cent whites and of 6.2 per cent in the case of the Indians.

In the Rivers and Smiths inlets the result has been a decrease of 12.7 per cent and 21 per cent in whites and Indians respectively.

In the case of salmon trolling, District No. 3 is the only one in which Orientals are permitted with the exception of one license in District No. 2. These licenses are divided between the east and west coast of Vancouver island. On the east coast the reduction in Orientals has been 51.3 per cent. The whites and Indians have increased 39.1 per cent and 58.5 per cent respectively. On the west coast the decrease in Orientals has been 57.5 per cent and the increase in whites and Indians has been 46.3 per cent and 87.9 per cent respectively.

During the year the number of Orientals employed in the seining and dry salting of herring was reduced by 25 per cent and it is the intention to make a further reduction of 25 per cent of the original number each year until all the Orientals are eliminated in the year 1927 and the industry will then be in the hands of white men and Canadian Indians only.

#### SCIENTIFIC INVESTIGATION

The permanent appointment of an officer in charge of the Biological Station at Nanaimo and the arrangement for the building and maintenance of a second station at Prince Rupert will go a long way towards solving the fishery problems of this province which are of such immense importance. The need of scientific investigation in connection with salmon and halibut fisheries particularly has been very urgent and although results cannot be hoped for in one or two years yet a start has been made and undoubtedly the results which will be obtained will well justify the steps taken.

#### POWER BOATS IN SALMON GILL-NET FISHING

Until the season of 1924 power boats were not permitted in the salmon gill-net fishing in the northern district, including such areas as the Naas river, Skeena river, Rivers inlet and Smiths inlet. The boats used were supplied by the cannery owners and were of the sailing skiff variety. Acting on the recommendation of the 1922 fisheries commission, however, power boats were permitted, commencing with the year 1924. The effect of this privilege is shown

in the following statement giving the total number of power boats used in each of the important areas:—

Area	Whites	Indians	Japs	Total
Smiths inlet.....	9			9
Rivers inlet.....	51	3		54
Skeena river.....	18			18
Naas river.....	1			1
Bella Coola.....	3			3
Total.....	82	3		85

It is observed that the average catch of the power boats in Smiths inlet was 1,358 sockeye while the average of sixty-one sailing skiffs was 1,309 sockeye. In the Skeena river district it was the sailing skiffs which turned in the larger catches and the power boats were found to be inconvenient owing to the tides and the difficulty in the taking in of the gill-nets. Against this of course a very great deal of hard work by means of rowing was eliminated with the power boats and the fishermen were far more comfortable.

In the Bella Coola area the catches by means of power boats were slightly better than those where sail boats were used.

Taking into consideration the extra initial cost and also the operating cost in the case of the power boats the increased gross returns to the fishermen would not appear to be commensurate with the increased expense.

#### REMOVAL OF OBSTRUCTIONS IN SALMON STREAMS

Each year considerable sums are spent by the department in keeping clear the streams up which salmon run to their spawning grounds. Much valuable work is done in this way although often under most hazardous conditions. Owing to the great distances which have to be covered in looking after this important work much time is consumed. Difficulty is often experienced in obtaining suitable men locally and these very often have to be taken considerable distances at much expense. However, the results obtained amply justify the expense which has been incurred to date and it is imperative that these very important operations be continued each year. Many reports of obstructions are received each season which on examination are found not to justify any expenditure but much valuable time is often lost owing to the necessity for officers of the department making long trips for the purpose of inspection and which show that the reported obstructions do not exist, or at least do not prevent parent fish reaching their spawning beds.

It is becoming increasingly difficult to supervise the operations of loggers who in their prodigal methods of cutting the timber often fill the smaller salmon streams with branches and tree tops in such a manner as to cause an obstruction to the ascent of salmon. While every effort is made to control such operations there are times when loggers will in a very short time cause considerable damage and either leave the country or become financially embarrassed and this results in the department's officers having to take whatever action is necessary. In instances where it is possible to have the work done by, or the cost recovered from the offenders, the necessary action is always taken.

#### WAREHOUSE AND MARINE WAYS, FRASER RIVER

The premises at present occupied on the Fraser river for the purposes of warehouse are in such a condition as to make it imperative that new quarters be obtained immediately. Owing to this fact and also in view of the large amount

of repair work which is required each year on the boats of the department it was considered advisable to obtain new quarters where marine ways, machine shop and warehouse could be combined and in addition a mooring float for the launches of District No. 1 provided. A very suitable site was procured on Poplar island and it is expected that in the early spring the construction will be completed and a considerable amount of the repairs to the boats can then be looked after by Engineer Allen with the assistance of other employees of the department and at a considerable saving.

#### SCOTCH FISHERMEN

It has been stated repeatedly that there are opportunities in the fishing industry in British Columbia for good white fishermen who are not afraid of work and who have had experience in other parts of the Empire. Particular mention has been made of Hebridean fishermen who it has been stated, owing to considerable distress lately suffered in their own country, have been considering emigrating to this coast. On their behalf arrangements have been made with the Government of British Columbia which may result in the bringing out of a number of families to certain portions of Vancouver island although no definite plans have yet been made. The Imperial Government is co-operating with the Government of British Columbia in this matter but it is hoped that satisfactory provision will be made looking to the living accommodation and occupation of these people before any considerable number are brought to this coast.

#### INSPECTION OF SPAWNING AREAS

The following is a concise report of conditions as found on the salmon spawning areas following the usual annual inspection by fishery officers after the fish had arrived on the several spawning beds.

*Queen Charlotte Islands.*—Owing to the fact that 1924 was the big year for pink salmon in the Queen Charlotte island district the run was very large and would appear to show no depletion. In the northern area the Mamion, Ian, Yakoun, Naden and Lignite rivers are the most important and the spawning areas of all these were found to be exceptionally well seeded with pink salmon. While the sockeye do run to the first four mentioned streams the quantity is very small compared to the pinks but the average was well maintained. The spawning areas in the creeks along the east coast of the islands were satisfactorily seeded. The condition on the west coast of these islands from a standpoint of lack of knowledge of the exposed uncharted waters results in no fishing operations apart from trolling for spring salmon from Skidegate inlet north.

*Naas River.*—In spite of the good pack amounting to 33,582 cases of sockeye the spawning areas were found to be particularly well stocked by parent sockeye salmon. The reports received from both the federal and provincial officers show an unusually large quantity of parent salmon and the prospects for a big return are excellent. The work done last year by the engineers of the department by way of repairs to the fishway in the Meziaden river proved to be extremely satisfactory and the salmon had absolutely no difficulty in passing into the lake and in fact at the time of inspection the inspecting officers estimate that they observed in the vicinity of 200 salmon in each of the basins of the fishway on their way through during the whole time of their stay. Approximately 90 per cent of these were sockeye. All the smaller rivers and streams flowing into the lower part of the Naas river were well seeded with pinks, chums, and cohoes.

*Skeena River.*—Although the pack of sockeye salmon on the Skeena was 144,747 cases, the third largest on record, the spawning areas were this year again heavily seeded and conditions generally over the watershed were found

to be extremely satisfactory. In the Lakelse lake area the run was very heavy and is claimed to have been the largest in a considerable number of years. The hatchery at that point was filled to capacity in a few days and many times the quantity of eggs could easily have been obtained. The spawning grounds were well seeded naturally. There was also a satisfactory supply of pink salmon in the lake.

In the Babine lake area which is the principal spawning district in the Skeena watershed for sockeye salmon, the several areas were found to have an abundant supply of parent fish. There was no difficulty in filling the hatchery at Morrison creek to capacity in a few days and many more eggs could have been taken. It is interesting to remember in this connection that during the first few years this hatchery was in existence eggs were collected at far distant points on the lake. Owing to the placing of the resultant fry in the stream which runs past the hatchery door the staff finds it unnecessary to go further than this same stream for a capacity collection and even then the parent fish are not all used. The run of sockeye, springs, cohoes and pinks to the Kispiox river was entirely satisfactory. At present there is an obstruction in the stream which has cut off a portion of the spawning grounds. This will be cleared away before the next run of salmon arrives.

Generally speaking the spawning areas of the Skeena were particularly well stocked this year.

*Central Division.*—Owing to the heavy rains during the runs of salmon practically all the streams in this area were well taken care of as the parent fish were able to ascend quickly instead of having to mill about the mouths of the streams waiting for the water to rise. In dry years they easily fall a prey to fishing operations particularly if the boundaries are not properly enforced.

*Bella Coola and Kimsquit.*—A very satisfactory run of sockeye reached the Bella Coola river estimated to exceed that of the preceding year by 50 per cent. The run of springs was also quite satisfactory and the same can be said of the pink and coho runs.

In the upper Kimsquit river satisfactory supplies of parent sockeye were observed. The supply of pinks and chums, however, was only fair. A large proportion of the runs of the fall varieties to Dean and Burke channels spawn in the small streams tributary and in certain instances these were found to contain poor supplies. The attention of the officers responsible has been called to this condition and any necessary steps will be taken looking to conservation.

*Rivers Inlet.*—The tributaries of Owekano lake, the spawning ground for Rivers inlet fish, were found to contain very large quantities of parent sockeyes even after a pack of 83,176 cases had been taken from the run. The condition of the beds was found to be unusually encouraging, all the streams without exception being found to be well stocked. In addition a collection of 15,998,000 sockeye eggs was made by the hatchery staff with no difficulty. Such a satisfactory state is ample evidence that the fishing regulations as enforced provide adequately for a good escapement of parent fish.

The benefit of the work done by the engineering staff in the way of clearing of obstructions to the ascent of salmon in the several streams emptying into Owekano lake has been splendidly demonstrated and there is no question as to the efficacy of such clearing operations. The general opinion is that the run to the inlet this year has been one of the best ever experienced.

*Smiths Inlet.*—During the fishing season there appeared to be evidence that a very large supply of parent fish on the spawning beds might be looked for. Unfortunately the local departmental officer found it impossible to make the usual annual inspection but a copy of a report received from the provincial officer, Mr. A. W. Stone, who is very familiar with conditions in this district,

shows that the quantity of spawn on the beds was not as large as was expected although it is probable that a fair run may be looked for in the cycle year.

*Alert Bay District.*—There was again a most satisfactory run of sockeye to the Nimpkish river in spite of the fact that there were ten drag-seines operating in the river and several purse-seines on the outside. By closely watching the quantity of parent salmon which were able to escape the nets during the fishing season and during the close season the boundaries were altered when necessary with the result that the examination of the spawning beds showed very satisfactory quantities of parent salmon on the spawning beds. The hatchery operations conducted by the British Columbia Fishing and Packing Company Limited on Nimpkish lake were discontinued after the liberation of fry in the spring of this year.

Through the district generally good runs of the fall varieties were experienced.

*Quathiaski District.*—This is primarily a fall fish area although at several points there is a fair run of sockeye salmon. The spawning beds generally speaking were heavily seeded with pinks particularly Salmon river and Bear river. Port Neville, which has been closed for four seasons in order that the small sockeye run at that point might be revived, showed the results of the closure and quite a good run was observed although that of the same variety to Phillips arm was only light.

*Comox District.*—This also is a fall fish area. The Oyster, Puntledge, Big Qualicum, Little Qualicum, and Tsolem rivers being the principal streams. There was a heavy run of pinks to practically all of these and the spawning beds were well seeded with this variety. The run of cohoes and chums, however, was very light. It is on the even numbered years that the big run of pinks occurs in the Comox district.

*Pender Harbour District.*—The only run of sockeye of any importance is to Sauch-en-Auch creek. The supply at this point had a few years ago shown the effects of intensive fishing and the boundaries were so placed as to give the fish a greater opportunity to ascend to the lake. In addition a fishway was constructed which has proved very efficient. The result is that the run has been increased very considerably and an inspection of the spawning grounds showed that the beds were extremely well seeded.

This being the "off" year for the pinks in the district the supply was found to be light and the quantity of chums can only be classed as medium. Greater care will be taken in the district to the end that the runs may be well conserved.

*Nanaimo District.*—This is not a sockeye area but there is usually a good run of chums. At Chemainus river the spawning grounds were heavily seeded with this variety. A heavy run was also observed at Porters creek, Bush creek, and Walkers creek and Stocking Lake creek. The coho run can only be classed as fair.

*Cowichan District.*—There are no sockeyes ascending the streams in this area. The spawning beds of the Cowichan and Koksilan rivers were well seeded with eggs of the spring and coho variety. There was also an excellent run of chums and steelhead trout to these streams.

*Alberni District.*—There was a fair run of sockeye salmon to the Stamp, Sproat, Somass and Anderson rivers. The chum run generally speaking was quite heavy particularly in the Stamp, Sproat, Somass, Nahmint and Salmon rivers, although the run at Sarita was not as good as expected. Pinks do not usually run to the Alberni district.

There was a heavy run of chum salmon at Nitinat lake and in spite of a pack of 47,742 cases of chums put up by the local cannery the spawning grounds

were found to be well seeded. There was a small run of creek sockeye to Nitinat lake as well but this is seldom fished.

Gordon river showed a good supply of coho salmon on the spawning grounds and this applies to the San Juan river as well.

*Clayoquot Sound District.*—The only sockeye streams in this area are the Kennedy and the Medgan rivers, the supply observed on the spawning grounds being quite satisfactory. In fact the areas in Kennedy lake were found to contain abundant quantities of sockeye spawn in spite of a pack of 4,737 cases put up by the cannery at the mouth of the Kennedy river and the shipping of a considerable quantity out of the district. The several streams in the district were found to be satisfactorily seeded with chums and cohoes.

*Nootka Sound District.*—This is primarily a chum district and on the Conuma, Sawand, Tashis and Verner rivers a plentiful supply of spawning chums were observed on the beds. Springs were fairly plentiful in the Burman and Gold rivers. The run of cohoes through the district was, however, quite small.

*Kyuquot District.*—Several of the streams contained fair supplies of pink salmon but this is not considered a pink area. An inspection of the spawning grounds showed a fair run of chums over the whole district and quite a good run of cohoes.

*Quatsino District.*—There are no sockeye in this area but the run of cohoes was quite good and the spawning areas showed quite a plentiful supply of parent chum salmon on the spawning grounds. As a rule there is only a medium run of pinks to the area.

*Fraser River Watershed.*—An examination of the spawning areas above Hells gate gives little encouragement although Stuart lake district Indians report having seen more sockeye this year than for some seasons previously, particularly at Middle river, Takla lake, and Tachi river. In the Bowron Lake district, a few sockeye were seen a considerable distance up Bear Creek. At Quesnel lake the indications of natural seeding were very disappointing, although during the summer large quantities of sockeye fingerlings are reported to have passed down the lake and river. The residents who have lived in the district for a considerable number of years remarked that it looked like old times to see so many fingerlings passing out to sea. There would seem to be every justification for the claim that these are the result of the egg planting operations by the Fish Cultural Branch of the department. There is nothing of particular interest from the other spawning areas above Hells gate. It was again definitely demonstrated, however, that the several varieties of salmon are able to pass Hells gate.

Below that point conditions have been found to be much more satisfactory.

At Harrison Lake the superintendent of the hatchery reports that the run of sockeye to the hatchery pond outlet was, for an "off" year, the best since the hatchery was built. There was quite a satisfactory run to Morris creek also and that to the rapids in the Harrison river was above the average. The collection of sockeye eggs at the Harrison Lake hatchery amounted to 6,518,000.

At Cultus lake over five million eggs were taken by the hatchery staff and the acting superintendent estimates that at least twenty millions could have easily been collected. He was obliged to knock out the bottom fence as it was impossible to hold between the fences all the salmon that came up to the lake.

In the Pitt lake district the superintendent of the hatchery estimates that the run of sockeye was the best since the hatchery was established.

The run of sockeye to the Birkenhead river and Pemberton district was the largest in the experience of the superintendent. Thirty-one millions of eggs were taken and enormous quantities of fish were permitted to pass up this river to spawn naturally.

This was an "off" year for the pink run to the Fraser river but the supply of chums was quite satisfactory.

#### GENERAL

Reviewing the conditions generally over the province it is safe to conclude that the sockeye spawning areas have, apart from above Hells gate on the Fraser river, with almost no exception, been unusually well seeded this year and this in spite of the fact that the pack of this variety is the largest since 1915. Heavy rains at the proper time undoubtedly assisted very materially and particularly in the case of the fall varieties. When the salmon arrived there was sufficient water in the streams to permit of their ascending to the spawning beds.



1905.....	67	"	"	1,080,673	(28,359 Red & Wh. Springs)	.....	44,458	13,970	1,167,480
1906.....	64	"	"	459,676	31,261	1,083	69,132	(68,305 Pks. & Ch.)	629,460
1907.....	58	"	"	314,074	23,159	2,939	87,900	(118,704	547,459
1908.....	52	"	"	355,023	25,433	2,731	81,917	"	542,689
1909.....	72	"	"	840,441	18,218	799	61,918	(46,544	967,920
1910.....	58	"	"	565,915	19,313	9,476	74,382	58,362	762,201
1911.....	59	"	"	383,509	38,751	9,705	119,802	305,247	948,965
1912.....	57	3,640	92	444,762	62,345	18,092	165,309	247,743	996,576
1913.....	78	4,782	74	972,178	37,433	3,616	69,822	192,887	1,353,901
1914.....	63	4,857	61	536,696	32,908	16,420	120,201	220,340	184,474
1915.....	63	4,951	61	476,042	51,734	6,370	146,956	367,352	82,000
1916.....	72	4,600	80	214,789	51,231	15,495	183,623	280,644	240,201
1917.....	94	5,286	1,370	339,848	48,630	27,646	157,589	496,759	475,273
1918.....	88	5,073	1,786	276,459	65,535	41,819 Pk. & Wh.)	191,068	527,745	1,616,157
1919.....	82	4,598	2,260	369,445	73,179	9,077	175,670	346,639	372,035
1920.....	65	4,761	1,855	351,405	95,983	8,441	101,972	520,856	84,626
1921.....	56	4,777	1,452	163,914	36,725	6,061	117,288	192,906	71,408
1922.....	64	4,491	1,513	299,614	21,163	11,913	102,845	581,979	258,204
1923.....	61	3,957	1,446	334,647	17,539	4,858	112,044	440,932	418,055
1924.....	62	3,696	1,553	369,601	18,741	2,591	115,944	657,561	570,497

NOTE.—Licenses issued 1923 and 1924 include transfers from one district to another.





## MARINE AND FISHERIES

## PACK OF CANNED SALMON ON THE SKEENA RIVER—1876 TO 1924

Year	Num-ber of can-neries oper-ated	Number of salmon licenses issued					Sockeye	Red Spring	Pink Spring	White Spring	Blue-backs	Steel-heads	Cohoos	Pinks	Chums	Total	
		G.N.	Troll.	P.S.	D.S.	T.N.											
1876	1						Particulars of varieties not available—practically all sockeye.									3,000	
1877	2							"	"	"	"	"					8,500
1878	2							"	"	"	"	"					10,603
1879	2							"	"	"	"	"					19,694
1880	2																
1881	2							"	"	"	"	"					21,560
1882	2							"	"	"	"	"					24,522
1883	5							"	"	"	"	"					31,157
1884	5							"	"	"	"	"					53,986
1885	2							"	"	"	"	"					12,900
1886	3							"	"	"	"	"					37,587
1887	5							"	"	"	"	"					58,592
1888	5							"	"	"	"	"					70,106
1889	6							"	"	"	"	"					58,165
1890	7							"	"	"	"	"					90,509
1891	7						"	"	"	"	"					78,135	
1892	8						"	"	"	"	"					90,280	
1893	7						"	"	"	"	"					59,675	
1894	7						"	"	"	"	"					61,151	
1895	7						"	"	"	"	"					67,797	
1896	8						"	"	"	"	"					100,140	
1897	8						"	"	"	"	"					65,905	
1898	6						"	"	"	"	"					81,234	
1899	7						"	"	"	"	"					108,026	
1900	10						"	"	"	"	"					128,529	
1901	11						"	"	"	"	"					126,092	
1902	10						"	"	"	"	"					154,875	
1903	10						"	"	"	"	"					98,669	
1904	11						93,404	(20,621	Red & Wh. Spr.)			10,315	30,529			154,869	
1905	12						84,717	(14,598	Red & Wh. Spr.)			7,247	7,523			114,085	
1906	14						86,394	20,138				16,867	(38,991	Pk. & Ch.		162,420	
1907	13						108,412	10,378				15,247	(25,217	Pk. & Ch.)		*159,255	
1908	13						139,846	13,374			468	10,075	(45,404	Pk. & Ch.)		209,177	





Year	8	74,452	1,254	9,505 (4,679 Pk. & Ch.)	89,890
1908	8	102,527	1,087	1,400 (300 Pk. & Ch.)	105,314
1909	8	141,921	383	2,075	144,398
1910	8	105,703	1,317	8,287	127,066
1911	8	129,217	1,452	11,095	158,798
1912	8	79,345	1,589	3,708	90,944
1913	8	89,890	566	7,789	109,052
1914	*7	162,651	1,022	7,115	179,431
1915	8	58,192	1,033	15,314	112,629
1916	9	75,326	715	9,124	113,758
1917	10	68,447	957	12,074	128,937
1918	10	66,842	86	29,542	6,729
1919	11	73,754	967	12,074	10,736
1920	10	72,072	234	9,038	127,532
1921	10	142,793	967	6,588	110,736
1922	10	135,245	241	9,038	13,053
1923	10	50,849	1,537	2,922	7,089
1924	10	49,729	1,537	26,189	109,334
1925	10	68,818	386	2,922	174,938
1926	10	66,518	406	3,055	165,390
1927	10	118,502	216	4,055	58,562
1928	10	112,360	216	4,784	60,569
1929	10	91,764	216	1,145	94,990
1930	10		216	24,311	311
1931	10		216	1,145	92,690
1932	10		216	1,526	133,930
1933	10		216	1,226	127,778
1934	10		216	1,886	114,318

NOTE.—Figures shown in black are packs from fish caught at Rivers Inlet or Smiths Inlet. Figures in black for years previous to 1918 are actual packs. Figures shown in *italic*, 1918 to 1923, are actual packs irrespective of where fish taken and not including fish shipped out for canning in other districts.

\* 1914 figures include Rivers Inlet pack only, no figures being available for Smiths Inlet for that year.  
 NOTE.—*It* column "Varieties other than sockeye packed at Smiths Inlet." For the years this column is utilized, figures of the different varieties other than sockeye packed at Smiths Inlet were not available, and had to be shown as a total. Sockeye for these years are shown under their proper heading.

† Statement No. 3 on page 68.

## PACK OF CANNED SALMON IN THE FRASER RIVER DISTRICT—1876 TO 1924

STATEMENT No. 5

Year	Num-ber of can-neries oper-ated	Number of salmon licenses issued					Sockeye	Red Spring	Pink Spring	White Spring	Blue-backs	Steel-heads	Cohoos	Pinks	Chums	Totals	
		G.N.	Troll.	P.S.	D.S.	T.N.											
1876	3	Particulars not available.					Particulars of varieties not available—practically all sockeye.										9,847
1877	5	"	"	"	"	"	"	"	"	"	"	"	"	"	"	64,387	
1878	8	"	"	"	"	"	"	"	"	"	"	"	"	"	"	105,101	
1879	7	"	"	"	"	"	"	"	"	"	"	"	"	"	"	50,490	
1880	7	"	"	"	"	"	"	"	"	"	"	"	"	"	"	42,155	
1881	8	"	"	"	"	"	"	"	"	"	"	"	"	"	"	142,516	
1882	11	"	"	"	"	"	"	"	"	"	"	"	"	"	"	199,104	
1883	13	"	"	"	"	"	"	"	"	"	"	"	"	"	"	109,701	
1884	6	"	"	"	"	"	"	"	"	"	"	"	"	"	"	38,437	
1885	6	"	"	"	"	"	"	"	"	"	"	"	"	"	"	89,617	
1886	11	"	"	"	"	"	"	"	"	"	"	"	"	"	"	99,177	
1887	12	"	"	"	"	"	"	"	"	"	"	"	"	"	"	130,088	
1888	12	"	"	"	"	"	"	"	"	"	"	"	"	"	"	76,616	
1889	16	"	"	"	"	"	"	"	"	"	"	"	"	"	"	303,875	
1890	16	"	"	"	"	"	"	"	"	"	"	"	"	"	"	241,889	
1891	11	"	"	"	"	"	"	"	"	"	"	"	"	"	"	178,954	
1892	11	"	"	"	"	"	"	"	"	"	"	"	"	"	"	79,715	
1893	21	"	"	"	"	"	"	"	"	"	"	"	"	"	"	457,797	
1894	20	"	"	"	"	"	"	"	"	"	"	"	"	"	"	363,967	
1895	21	"	"	"	"	"	"	"	"	"	"	"	"	"	"	400,368	
1896	29	"	"	"	"	"	"	"	"	"	"	"	"	"	"	356,984	
1897	35	"	"	"	"	"	"	"	"	"	"	"	"	"	"	860,459	
1898	35	"	"	"	"	"	"	"	"	"	"	"	"	"	"	256,101	
1899	41	"	"	"	"	"	"	"	"	"	"	"	"	"	"	510,383	
1900	48	"	"	"	"	"	"	"	"	"	"	"	"	"	"	316,522	
1901	49	3,832	Particulars not available				"	"	"	"	"	"	"	"	"	990,313	
1902	42	2,685	Other Varieties:				293,477	33,618									327,095
1903	35	3,101	204,809 (2,084: Red and White Spring)				72,688	25,728									237,125
1904	23	2,224	72,688 (9,482: Red and White Spring)					45,667									128,903

1905	38	2,770	"	837,489	(5,507: Red and White Spring)	.....	30,836	3,304	.....	877,136
1906	24	1,746	"	183,007	6,503	.....	34,413	(15,543 Pk. & Ch.)	.....	240,486
1907	18	1,726	"	59,815	3,448	.....	35,766	(63,530 Pk. & Ch.)	.....	163,116
1908	16	1,374	"	63,126	1,427	.....	24,198	(415 Pk. & Ch.)	.....	89,184
1909	38	2,688	"	542,248	1,428	.....	21,540	(1,987 Pk. & Ch.)	.....	567,203
1910	21	1,577	"	133,045	1,018	.....	27,855	128	62,177	223,148
1911	15	1,396	"	58,487	7,028	.....	39,740	142,101	47,237	301,344
1912	15	1,430	"	108,784	14,655	.....	38,574	574	12,961	173,921
1913	35	2,560	"	684,566	3,573	.....	11,648	9,973	22,220	732,089
1914	20	2,656	"	185,483	9,485	.....	35,639	6,057	74,726	328,390
1915	22	2,616	"	89,040	15,388	.....	34,114	128,555	18,539	289,119
1916	21	2,240	"	27,394	11,096	.....	24,580	840	30,184	106,440
1917	29	2,626	"	123,614	10,197	.....	25,895	134,442	59,973	377,988
1918	18	1,582	1	16,849	15,192	.....	40,111	18,388	86,215	206,003
1919	14	1,337	1	29,628	14,519	.....	39,253	39,363	15,718	158,718
1920	11	1,288	.....	44,588	19,961	.....	22,034	12,839	23,884	132,860
1921	13	1,437	.....	35,900	11,360	.....	29,378	8,178	11,223	103,917
1922	10	1,296	.....	48,744	2,433	.....	23,587	29,578	17,895	137,482
1923	11	964	.....	29,423	3,854	.....	20,173	63,645	103,248	224,637
1924	9	969	.....	36,200	2,982	.....	21,935	31,968	109,495	209,080

NOTE.—Licenses issued 1923 and 1924 include transfers from other districts.

## PACK OF CANNED SALMON OF PUGET SOUND FROM 1887 TO 1923

## STATEMENT No. 6

Year	Number of canneries operated	Spring	Sockeye	Cohoe	Chum	Pink	Steelhead	Total
1887		Particulars of varieties not available.						22,000
1888	4	"	"	"	"	"	"	21,975
1889	2	240		7,480	1,145	2,890		11,674
1890	1	1,000		3,000	4,000			8,000
1891	2	382	5,538	5,869	3,093	5,647		20,529
1892	2	86	2,954	7,206	16,180			26,426
1893	3	1,200	47,852	11,812	11,380	17,530		89,331
1894	3		41,781	22,418	22,152	9,049		95,400
1895	7	1,542	65,143	50,865	38,785	23,633		179,968
1896	11	13,495	72,979	82,640	26,550			195,664
1897	12	9,500	312,048	91,900	23,310	57,268		494,026
1898	18	11,200	252,000	98,600	38,400			400,200
1899	19	24,364	499,646	111,337	31,481	252,733		919,611
1900	19	22,350	229,800	128,200	89,100			469,450
1901		Particulars of varieties not available.						1,380,590
1902	21	30,049	372,301	85,817	93,492			581,659
1903	22	14,500	167,211	103,450	12,001	181,236		478,488
1904	13	14,441	109,264	118,127	49,656			291,488
1905	24	1,804	825,453	79,335	41,057	70,992		1,018,641
1906	16	8,139	178,748	94,497	149,218			430,602
1907	14	1,814	93,122	119,372	50,249	433,423		698,080
1908	22	95,210	170,951	128,922	47,607	6,075		448,765
1909	11	13,019	1,097,904	143,133	53,688	370,993		1,632,949
1910	24	10,064	248,014	162,755	146,942	108		567,883
1911	15	21,823	127,761	256,124	104,321	1,046,992		1,557,029
1912	20	20,252	184,680	149,727	60,760	700		416,125
1913	22	1,234	1,673,009	61,019	56,225	791,886		2,583,463
1914	31	26,044	335,230	151,893	278,801	892		792,860
1915	41	28,466	64,548	180,783	411,724	583,649		1,269,206
1916	32	37,030	84,637	155,832	427,878	1,887		707,278
1917	45	57,543	411,538	114,276	316,285	1,124,884		1,921,554
1918	32	63,366	50,723	235,860	267,538	6,605	106	624,198
1919	35	68,542	64,346	210,883	525,541	421,215	5,076	1,295,626
1920	11	25,846	62,654	24,502	48,849	4,669		166,520
1921	23	25,567	102,967	89,412	30,831	404,713		653,490
1922	16	20,615	48,566	111,711	65,552	2,225		248,729
1923	18	15,777	47,402	122,000	97,081	475,849	29	758,138
1924	12	19,968	69,369	87,879	134,360	5,945	128	317,649

## STATEMENT OF HALIBUT LANDINGS—BRITISH COLUMBIA, 1913 TO 1924

## STATEMENT No. 7

	Cwts.
1913	223,465
1914	214,444
1915	194,866
1916	123,062
1917	113,529
1918	186,229
1919	210,777
1920	238,770
1921	325,868
1922	293,184
1923	334,667
1924	330,591

STATEMENT SHOWING INCREASE OR DECREASE IN LICENSES ISSUED IN 1924 OVER LICENSES ISSUED IN 1921 AND 1922,  
BRITISH COLUMBIA

Statement No. 8

FISHERIES BRANCH

75

Variety of License	Area	Licenses issued, 1924				Increase over 1922			Decrease from 1922			Totals All nationalities	
		Whites	Indians	Japs.	Total	Whites	Indians	Japs.	Whites	Indians	Japs.	Net In-crease	Net De-crease
						%	%	%	%	%	%	%	%
Salmon Gill-net.....	Whole province.....	1,443	1,074	1,179	3,696		42		27		810		795
"	District No. 1.....	401	45	523	969	11	11				349		327
"	District No. 2— Naas River.....	17	98	95	210	2.8	32.3				40		25.2
"	Skeena River.....	248	308	385	941				15	16	63		94
"	Rivers Inlet and Smiths Inlet.....	503	369	91	963				46.9	14	39.9		30.9
"	Outlying.....	144	162	56	362	89	18				257		150
"	Total District No. 2.....	912	937	627	2,476	56	6.2				40		15.9
"	District No. 3.....	130	92	29	251	83			64	98	66		228
"	Whole province.....	88	12	101	201				12.7	21	42		19.1
"	Whole province.....	51		25	76				91		55		63
"	Whole province.....								38.7		49.5		14.8
"	Whole province.....								81	13	441		535
"	Whole province.....								8.2	1.4	41.3		17.7
"	Whole province.....										20	67	
"	Whole province.....										40.9	36.4	
"	Whole province.....										64		47
"	Whole province.....										38.8		18.9
"	Whole province.....										16		50
"	Whole province.....								34		39		39.7

STATEMENT SHOWING INCREASE OR DECREASE IN LICENSES ISSUED IN 1924 OVER LICENSES ISSUED IN 1921 AND 1922,  
BRITISH COLUMBIA—Concluded

STATEMENT No. 8

Variety of License	Area	Licenses issued, 1924				Increase over 1921				Decrease from 1921			Totals All nationalities	
		Whites	Indians	Japs.	Total	Whites	Indians	Japs.	%	Whites	Indians	Japs.	Net In-crease	Net De-crease
Salmon Trolling.....	Whole province.....	776	552	225	1,553	167	213	279	101	27.4	62.8	55.4	6.9	.....
"	District No. 1.....	48	.....	.....	48	23	.....	.....	23	92	.....	.....	23	.....
"	District No. 2.....	217	186	1	404	16	53	.....	65	8	39.9	4	19.2	.....
"	District No. 3— East Coast.....	331	103	94	528	93	38	.....	32	39.1	58.5	99	6.4	.....
"	West Coast.....	180	263	130	573	57	123	.....	4	46.3	87.9	176	0.7	.....
"	Total, District No. 3. Percentage.....	511	366	224	1,101	150	161	.....	36	41.6	78.5	275	3.4	.....



**SUMMARY—BRITISH COLUMBIA—COMPARATIVE STATEMENT OF LICENSES ISSUED—SEASON 1924-1925—Concluded**  
**As at December 31, 1924**

STATEMENT No. 9

	Season, 1922 Issued				Season, 1923 Licenses issued and transfers made				Season, 1924 Licenses issued and transfers made			
	Whites	Indians	Japs.	Total	Whites	Indians	Japs.	Total	Whites	Indians	Japs.	Total
Groundfish Drag-seine.....	10		2	12	6		1	7	14	1	1	16
Groundfish Trawl.....	26		34	60	32		20	52	19		21	40
Herring and Perch Prospecting.....	1			1								
Octopus.....	1			1								
Oolichan.....	16	1	2	19	17	2	1	20	12	2	1	15
Perch Drag-seine.....	13	7		20	15	6		21	13	2		15
Perch Gill-net.....	6		7	13	6		6	12	5		6	11
Perch Trap-net.....	1			1								
Perch Trawl.....	1		7	8	3		1	4			1	1
Rock Cod Trawl.....			9	9	1		1	2			1	2
Sand Lance.....			1	1	1		1	2	1			
Sea Egg.....			1	1								
Shrimp Trawl.....	11		29	40	15		21	36	9		21	30
Trapang.....			1	1			1	1				
Angling Permits.....	51		1	52	4		1	5	7			7
Totals.....	3,115	1,545	2,933	7,593	3,934	2,598	2,627	9,159	3,800	2,774	2,537	9,111
Indian Permits.....						153		153		59		59

NOTE.—Previous to 1923 transfers of licenses from one district to another were not allowed. 1923 and 1924 figures include such transfers, as it is considered that if such were not permitted, licenses in their places would have been issued. With the exception of Grayfish Hook and Line Licenses figures show actual licenses issued, transfer of Japanese licenses not being permitted; these figures include twelve transferred Oriental licenses.

## APPENDIX 2

## FISHERIES

## FINANCIAL STATEMENT, 1924-1925

Vote No.	Service	Appropriation	Expenditure
		\$ cts.	\$ cts.
256	Salaries and disbursements of fishery officers, Fisheries Patrol Service, Fisheries Protection Service.....	880,000 00	771,068 69
257	Building fishways and clearing rivers.....	30,000 00	7,692 83
258	Legal and incidental expenses.....	2,000 00	2,000 00
259	Conservation and development of deep-sea fisheries.....	95,000 00	29,829 18
260	Fisheries Intelligence Bureau.....	2,000 00	404 03
261	Inspection of canned and pickled fish.....	25,000 00	22,994 50
262	Fish culture.....	370,000 00	346,997 66
263	Investigations, into fisheries.....	10,000 00	7,230 03
264	Marine Biological Board.....	42,000 00	42,000 00
		1,456,000 00	1,230,216 92
	Civil Government salaries.....	98,180 00	92,414 29
	Contingencies.....	20,000 00	14,226 11
Stat'y.	Fishing bounty.....	160,000 00	159,826 40
		1,734,180 00	1,496,683 72
363	Cost of Living Bonus.....		36,307 83
	Superannuation No. 4, Retirement Act, 1920.....		2,516 66
	Superannuation No. 4, Retirement Act, 1920 (annuity).....		196 94
	Gratuities.....		730 00
	Unforeseen expenses (Finance Department).....		10 00
	Total net expenditure, 1924-1925.....		1,536,445 15



FISHERIES BRANCH

Provinces	Inspector's, Overseer's and Ward's		Allowances				Gasolene and Oil	Special Guardians		Sundry	Total
	Salaries	Disbs.	Auto	Boat	Horse			Wages	Expenses		
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Nova Scotia—</i>											
General Account.....	11,509 67	1,327 25								223 39	13,062 31
Truro School.....		3,564 08								613 95	4,178 03
Nova Scotia, District No. 1.....	13,320 00	2,557 59	3,200 00	681 25		227 41	15,709 35	66 90		166 86	35,829 36
" " No. 2.....	16,598 23	3,141 76	4,281 72	253 76		217 40	7,806 11	338 12		309 84	32,946 94
" " No. 3.....	17,981 61	3,525 61	3,884 94	64 52	475 00	23 36	6,596 00	71 75		132 10	32,754 89
	59,409 51	14,116 29	11,366 66	999 53	475 00	468 17	30,111 46	467 77		1,348 14	118,771 53
<i>Prince Edward Island—</i>											
Prince Edward Island, District No. 1.....	8,250 00	2,234 39				1,600 00	5,820 67	457 55		850 35	19,212 96
" " No. 2.....	2,370 00	765 68		300 00		312 20	549 00			131 19	4,428 07
	10,620 00	3,000 07		300 00		1,912 20	6,369 67	457 55		981 54	23,641 03
<i>New Brunswick—</i>											
New Brunswick, District No. 1.....	9,600 00	1,763 00	1,600 00	400 00	230 00	165 22	2,945 00	10 00		97 67	16,810 89
" " No. 2.....	17,361 30	2,977 51	4,676 34	1,226 21		755 10	10,026 57	33 00		151 98	37,208 01
" " No. 3.....	7,080 00	1,205 35	500 00	93 75	375 00	113 74	7,041 30			19 66	16,428 80
	34,041 30	5,945 86	6,776 34	1,719 96	605 00	1,034 06	20,012 87	43 00		269 31	70,447 70
<i>Quebec.....</i>										178 47	178 47
<i>Manitoba.....</i>	7,928 98	3,003 58		215 60	800 00		885 52	1,257 37		106 78	14,197 83
<i>Saskatchewan.....</i>	9,279 56	3,762 15	281 25	187 50	1,250 00		480 00	1,151 62		77 42	16,469 50
<i>Alberta.....</i>	8,915 00	4,337 40	225 00	262 50	600 00		942 50	1,034 25		114 72	16,431 37
<i>British Columbia—</i>											
General Account.....	18,170 14	1,309 07								3,168 70	22,647 91
British Columbia, District No. 1.....	10,550 50	7,885 65					7,566 14	1,800 45		1,271 08	29,053 82
" " No. 2.....	11,540 46	3,005 85					3,887 67	598 50		1,517 17	20,949 65
" " No. 3.....	13,442 61	6,308 76				99 88	5,311 10	1,941 84		322 82	27,427 01
	53,703 71	18,489 33				99 88	16,764 91	4,340 79		6,679 77	100,078 39
General Account.....										10,501 66	10,501 66

DETAILED STATEMENT OF EXPENDITURE, SALARIES AND DISBURSEMENTS OF FISHERY OFFICERS, 1924-25—Concluded

SUMMARY

Provinces	Inspector's, Overseer's and Ward's				Allowances				Gasolene and Oil	Special Guardians		Sundry	—	Total		
	Salaries		Disbs.		Auto		Boat			Horse					Wages	Expenses
	\$	cts.	\$	cts.	\$	cts.	\$	cts.		\$	cts.	\$	cts.			
	\$	cts.	\$	cts.	\$	cts.	\$	cts.		\$	cts.	\$	cts.	\$	cts.	
Nova Scotia.....	59,409	51	14,116	29	11,366	66	999	53	475	00	30,111	46	1,348	14	118,771	53
Prince Edward Island.....	10,620	00	3,000	07			300	00			1,912	20	981	54	23,641	03
New Brunswick.....	34,041	30	5,945	86	6,776	34	1,719	96	605	00	1,034	06	269	31	70,447	70
Quebec.....											1,034	06	178	47	178	47
Manitoba.....	7,928	98	3,003	58			215	60	800	00	885	52	106	78	14,197	83
Saskatchewan.....	9,279	56	3,762	15	281	25	187	50	1,250	00	480	00	77	42	16,469	50
Alberta.....	8,915	00	4,337	40	225	00	262	50	600	00	942	50	114	72	16,431	37
British Columbia.....	53,703	71	18,439	33							99	88	6,679	77	100,078	39
General Account.....											16,764	91	10,501	66	10,501	66
	183,898	06	52,654	68	18,649	25	3,685	09	3,730	00	75,566	93	20,257	81	370,717	48

## DETAILED STATEMENT OF EXPENDITURE—FISHERIES PATROL SERVICE, 1924-1925

Establishments and Accounts	Paylist	Board or Prov'n.	Fuel	Repairs		Supplies			Clothing	Sundry		Total
	\$	cts.	\$	Hull	Engine	Deck	Stewards		\$	cts.	\$	cts.
<i>Nova Scotia—</i>												
"Mildred McColl"	3,633 94	0 38	1,672 71	119 12	712 13	74 52	67 74		64 61			6,565 21
"A"	2,548 01	2 46	595 65	70 00	89 60	28 51	29 25		96 25			3,624 32
	6,181 95	2 84	2,268 36	189 12	801 73	103 03	96 99		160 86			10,189 53
<i>Prince Edward Island—</i>												
"Cistrea"	1,086 66		169 02	29 48	40 00	7 96	44 95		4 20			4 20
"Richmond"									71 43			1,479 52
	1,086 66		169 02	29 48	40 00	7 96	44 95		75 63			1,483 72
<i>New Brunswick—</i>												
"C"												
"Halatope"	3,826 61		679 93		52 11	53 58	57 69		130 00			130 00
"Shannon" (chartered)	2,580 00		730 33		30 42				10 00			5,146 44
	6,406 61		1,410 26		52 11	53 58	57 69		604 25			3,945 00
									744 25			9,221 44
<i>Manitoba—</i>												
"Bradbury"	9,896 36	2,607 40	6,287 21	39 52	17 60	864 83	371 08		242 75			21,519 12
<i>British Columbia—</i>												
General Account			29 05	3 65	381 76	6 65	0 44		1,549 86			2,116 22
Digby Island	2,935 36	24 67	65 62		0 85	5 19	0 33		221 53			3,353 53
Sapperton Warehouse	840 00		63 51			5 90	12 13		6 40			1,070 50
<i>Chartered Boats</i>												
"Akashi"	882 18		520 75						1,240 00		2,688 08	48,247 89
"Aramac"	440 82		114 00						134 00		734 57	
"Baker"	351 61		33 52						109 00		504 41	
"Coryca"	245 16		50 16						76 00		395 02	
"Dorothy N."	800 00		93 21						218 30		1,122 56	
"Dustie"	519 35		107 90						690 00		1,334 00	
"Fefobe"	462 60		144 65						696 00		1,337 19	
"Echo No. 1"	772 50		59 66						840 00		1,695 88	
"Elk"	437 64		64 78						137 00		653 53	
"Elkhart"	545 49		48 39						199 50		800 78	
"Eric"	150 00		18 50						45 00		213 50	
"Esperanza"		1 00	468 00						291 50		1,874 08	
"Fier"	1,029 03		24 76						31 00		62 05	
"Flying Spur"	747 66		150 30						807 00		1,736 04	

## DETAILED STATEMENT OF EXPENDITURE—FISHERIES PATROL SERVICE, 1924-1925—Continued

Establishments and Accounts	Paylist \$ cts.	Board or Prov'n. \$ cts.	Fuel		Repairs		Supplies		Clothing \$ cts.	Sundry \$ cts.		Total \$ cts.
			\$ cts.	\$ cts.	Hull \$ cts.	Engine \$ cts.	Engine \$ cts.	Deck \$ cts.		Stewards \$ cts.		
British Columbia— Chartered Boats—Con.—												
"G. D. S."												
"Gene"	143 33		22 60				5 91			44 75	216 59	
"Grizzly"	798 71		386 28				53 55			1,095 80	2,336 00	
"Hush"	669 61		161 88				19 60			546 00	1,397 09	
"Leinsh"	258 06		78 75				23 75			79 30	439 86	
"Lemon"	290 49		110 34	45 00	46 95		29 19			314 00	835 97	
"Limit"	220 00		35 55				8 30			62 50	326 35	
"Lively"	136 67		13 66				2 43			43 00	196 48	
"Marie S."	216 66		38 95				3 99		0 72	58 00	317 60	
"Mary"	895 81	0 67	191 36				48 60		13 77	861 00	2,011 21	
"Mary Ellen"	377 42		137 54				15 70			118 00	648 66	
"Moon Winks"	670 00		46 05				4 10			184 00	904 15	
"Mytanwy"	136 67		17 01				7 99			43 00	204 67	
"Nan"	614 99		367 47	13 55	2 75		34 48			835 05	1,868 29	
"Niicolson"	619 35		64 09				7 60			192 91	883 95	
"Noolhak"	400 00		90 99				8 91		1 60	227 00	734 28	
"Odessa"	551 29		232 84				27 37		3 64	518 00	1,333 14	
"Oh Boy"	713 20		220 16				16 75		2 00	788 00	1,740 11	
"Olive"	757 50		436 26				61 53		6 52	1,030 00	2,291 81	
"Oyashimo"	426 67		109 31				13 71			135 91	685 60	
"Phoenix"	1,034 19		200 36				20 94		7 44	1,053 93	2,315 93	
"Pinto"	446 99		120 86				26 15			137 50	731 50	
"Pip"			23 10				2 30		2 00		27 40	
"Pontiac"	143 33		65 45				15 56			44 50	268 84	
"Regal R."	203 33		54 00				9 00			55 00	321 13	
"Reliance"	49 68										49 68	
"Rover"	1,248 38		107 41				25 01		3 50	1,028 35	2,412 65	
"Sea-Dog"	772 50		160 47				24 42		4 98	525 00	1,487 37	
"Spruce"	332 26									103 50	435 76	
"S. Queen"	151 05									105 00	256 05	
"Stubbs"	258 93		69 50				30 10			79 49	438 02	
"Tatqua"	500 00		62 23				18 60			154 00	734 83	
"Ukatav"				12 00	3 00					52 50	67 50	
"Votomac"	874 60		331 25				52 88		3 20	1,180 00	2,441 93	
"Volny"	100 00		12 72				4 00			41 00	157 72	
"W. T."	715 00		135 26				28 99			483 00	1,362 25	
	140 00		24 75				6 23			44 65	215 63	
Departmental Boats												
"Anina"			61 29	18 55	92 95		16 25			66 20	286 09	
"Babine No. 1"	700 00		102 38	3 15	14 46		14 25			3 83	889 06	
"Babine No. 2"	812 90		102 38	5 09	7 96		15 25			20 33	993 55	
"Black Raven"	979 84		1,077 31	349 36	318 87		124 90			26 41	3,078 99	

"Bonilla"	2, 917 96	1, 024 41	389 08	208 42	203 50	47 43	59 25	114 51	4, 964 56
"Cloyah"	1, 649 16	500 80	454 77	146 45	161 10	126 34	114 11	195 79	3, 350 52
"Cohoe"	1, 899 20	488 79	223 35	165 20	40 84	7 52	31 10	58 09	1, 922 37
"Egret"	1, 515 00	488 02	333 90	244 22	45 88	46 52	65 85	77 10	2, 816 49
"Elk"	3, 420 00	426 01	74 55	2 20	2 17	16 56	43 98	80 10	4, 065 57
"Fispa"	4, 500 00	524 29	649 97	177 28	23 86	56 25	118 28	40 00	40 00
"Foam"	1, 008 06	70 17	451 03	2, 998 11	227 01	95 46	88 12	103 05	6, 168 43
"Gull"	1, 804 44	401 15	104 90	244 88	64 08	67 54	42 37	114 94	5, 067 78
"Hawk"	1, 299 55	447 95	350 05	54 35	81 78	43 33	37 39	55 68	2, 885 04
"Heron"	1, 320 97	399 56	242 83	56 15	56 78	23 06	68 22	51 86	2, 366 26
"Humming Bird"	5, 563 96	2, 162 73	1, 773 86	107 20	269 19	359 13	200 91	46 51	64 65
"Linnett"	1, 147 55	323 35	76 98	34 16	59 09	77 60	10 26	389 90	2, 265 23
"Marfish"	4, 500 00	749 84	291 08	65 56	84 83	10 66	33 20	40 06	12, 064 03
"Merrysa"	2, 099 69	463 50	32 42	325 48	1, 361 64	630 06	498 43	217 32	6, 320 29
"Revidis"	4, 500 00	562 34	226 49	208 62	1, 403 95	41 26	83 17	6, 069 01	11, 480 23
"Swan"	5, 229 24	574 94	173 54	360 15	1, 403 95	563 78	321 69	95 77	5, 725 85
"Vanadis"	3, 420 00	570 80	140 32	138 13	21 57	4 79	40 64	6, 080 23	15, 890 20
"Vedder"	76, 413 09	2, 394 56	6, 440 17	6, 831 59	5, 538 71	2, 381 00	2, 081 36	41 06	4, 377 31
General Account.....	225 00							33, 558 04	153, 580 33
								85 00	310 00

## SUMMARY

Nova Scotia.....	6, 181 95	2 84	2, 268 36	189 12	801 73	338 18	103 03	96 99	160 86	10, 189 53
Prince Edward Island.....	1, 086 66		169 02	29 48	40 00	30 02	7 96	44 95	75 63	1, 483 72
New Brunswick.....	6, 406 61		1, 410 26		52 11	461 30	53 58	57 69	744 25	9, 221 44
Manitoba.....	9, 896 36	2, 607 40	6, 287 21	39 52	17 60	381 87	864 83	371 08	242 75	21, 519 12
British Columbia.....	76, 413 09	2, 394 56	17, 721 72	6, 440 17	6, 831 59	5, 538 71	2, 381 00	2, 081 36	33, 558 04	153, 580 33
General Account.....	225 00								85 00	310 00
	100, 209 67	5, 004 80	27, 856 57	6, 698 29	7, 743 03	6, 750 08	3, 410 40	2, 652 07	34, 866 53	196, 304 14



## DETAILED STATEMENT OF EXPENDITURE, FISH CULTURE, 1924-25

Hatcheries	Saldries	Mainten- ance	Total of Hatchery	Total of Provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Nova Scotia</i> .....				32,467 75
Bedford.....	1,275 00	9,702 90	10,977 90	
Lindloff.....		961 69	961 69	
Margaree.....	3,600 00	3,272 40	6,872 40	
Margaree Pond.....	377 42	3,945 48	4,322 90	
Middleton.....	2,460 00	3,560 27	6,020 27	
Windsor.....	1,220 00	2,092 59	3,312 59	
<i>Prince Edward Island</i> .....				5,147 60
Kelly's Pond.....	2,745 00	2,402 60	5,147 60	
<i>New Brunswick</i> .....				46,096 12
Grand Falls.....	2,565 00	1,538 22	4,103 22	
Miramichi.....	2,940 00	3,035 71	5,975 71	
Miramichi Pond.....		2,930 56	2,930 56	
Nepisiquit.....		1,095 98	1,095 98	
New Mills Pond.....	709 90	3,995 97	4,705 87	
Restigouche.....	2,820 00	3,417 23	6,237 23	
Sparkle.....	260 81	569 78	830 59	
St. John.....	2,730 00	6,468 76	9,198 76	
St. John Pond.....		10,660 73	10,660 73	
Tobique.....		357 47	357 47	
<i>Ontario</i> .....				79,471 88
Collingwood.....	2,940 00	8,043 97	10,983 97	
Kenora.....	4,050 00	9,019 67	13,069 67	
Kingsville.....	3,940 00	4,687 04	8,627 04	
Port Arthur.....	2,520 00	3,585 18	6,105 18	
Sarnia.....	3,868 55	4,533 13	8,401 68	
Southampton.....	2,439 29	6,893 34	9,332 63	
Thurlow.....	5,460 00	9,824 45	15,284 45	
Wiarton.....	4,050 00	3,617 26	7,667 26	
<i>Manitoba</i> .....				25,646 64
Dauphin River.....	941 29	1,241 78	2,183 07	
Dapuhin River Spawn Camp.....		1,456 18	1,456 18	
Gull Harbour.....	2,130 00	7,521 88	9,651 88	
Winnipegosis.....	2,130 00	10,225 51	12,355 51	
<i>Saskatchewan</i> .....				8,505 56
Qu'Appelle.....	2,640 00	5,865 56	8,505 56	
<i>Alberta</i> .....				5,279 71
Banff.....	2,480 00	1,931 61	4,411 61	
Jasper Park.....		50 20	50 20	
Spray Lakes.....		817 90	817 90	
<i>British Columbia</i> .....				124,025 49
General Account.....	7,302 42	3,646 28	10,948 70	
Anderson Lake.....	2,574 17	5,944 68	8,518 85	
Babine Lake.....	1,836 03	6,644 31	8,480 34	
Cowichan Lake.....	2,359 33	4,516 72	6,876 05	
Cultus Lake.....	699 86	5,018 84	5,718 70	
Cranbrook Eyeing Station.....	320 65	193 23	513 88	
Fifteen Mile Creek.....		3,155 16	3,155 16	
Gerrard Lake.....	254 67	2,719 53	2,974 20	
Harrison Lake.....	4,395 80	4,577 55	8,973 35	
Kennedy Lake.....	2,559 78	4,890 76	7,450 54	
Lloyd's Creek Eyeing Station.....	255 00	937 33	1,192 33	
Nelson Eyeing Station.....	647 50	2,592 90	3,240 40	
Pemberton Lake.....	4,392 42	5,256 01	9,648 43	
Pitt Lake.....	1,087 19	6,028 76	7,115 95	
Rivers Inlet.....	2,409 68	20,480 83	22,890 51	
Skeena River.....	2,323 39	8,841 29	11,164 68	
Stuart Lake.....	1,440 00	3,723 42	5,163 42	
<i>General Account</i> .....	6,500 71	13,856 20		20,356 91

## SUMMARY

Nova Scotia.....	8,932 42	23,535 33	32,467 75
Prince Edward Island.....	2,745 00	2,402 60	5,147 60
New Brunswick.....	12,025 71	34,070 41	46,096 12
Ontario.....	29,267 84	50,204 04	79,471 88
Manitoba.....	5,201 29	20,445 35	25,646 64
Saskatchewan.....	2,640 00	5,865 56	8,505 56
Alberta.....	2,480 00	2,799 71	5,279 71
British Columbia.....	34,857 89	89,167 60	124,025 49
General Account.....	6,500 71	13,856 20	20,356 91
	104,650 86	242,346 80	346,997 66



## APPENDIX 3.

REPORT ON FISHWAYS AND REMOVAL OF OBSTRUCTIONS, BY  
CHARLES BRUCE, FISHERIES ENGINEER

The following fishways and dams were inspected by the fisheries engineer during the year:—

## NOVA SCOTIA

1. *Yarmouth Light and Power Co. Ltd., Tusket River.*—The fishway built in 1923 in the dam of the above company proved effective during the season of 1924, and numbers of fish ascended.

During the summer the company made extensive alterations to the dam, diverting the discharge therefrom to another point with the result that the present lower end of the fishway will have to be changed. As the company had not completed its construction last year the changes in the fishway were left in abeyance until the coming summer when conditions can be definitely ascertained.

2. *Clyde Pulp Company, Limited, Clyde River.*—The fishway in the diversion dam on this river was completed in 1923, and resulted in a great improvement over former conditions.

3. *Mersey River, Liverpool County.*—During the summer of 1923 the fishways in the five dams on this river were entirely reconstructed. Results were all that could be hoped for. Adequate proof that salmon ascended was furnished by the fact that in the spring of 1924 about 200 "slink" salmon coming down river were trapped in the flume of one of the pulp mills. Several minor improvements which were found to be necessary were made to the fishways in 1924. The ascent of salmon in 1923 is the first that has occurred for a number of years, as previously the fishways were not effective.

4. *Beaver Dam Brook, Liverpool County.*—During the last summer the channel of this brook was improved by the removal of stone obstructions. Large numbers of alewives ascend this brook and the young were being destroyed by reason of the obstructions.

5. *Medway River, Pulp Mill Dam.*—The fishway in this dam operated very effectively during the season. An instance worthy of note is that shad ascended the river by the fishway in considerable numbers, the first that have been observed by the inspector. The undersigned saw about one hundred of them above the dam on their return to the sea during an inspection in July.

6. *Petite Riviere, Lunenburg County.*—Improvements made to the several fishways on this river in the spring of 1924 resulted in their being rendered effective for the ascent of fish.

7. *Lahave River, Lunenburg County.*—Improvements were made to the fishways in both the first and second dams on the river in 1923. During the season of 1924 salmon were seen some miles above these dams.

8. *Sheet Harbour, East River, Halifax County.*—The fishway in the Malay falls hydro-electric development, built in 1923, proved effective, and during the summer of 1924 numbers of salmon ascended. This fishway overcomes a total head of about 50 feet.

During the season of 1924 the Nova Scotia Power Commission proceeded with a second power development on this river below the Malay falls at what is

known as Ruth falls. The total head at this plant will be approximately 110 feet, which is developed by a dam some forty or fifty feet high, and a canal along the bank of the river nearly a mile in length. In order to secure the maximum power the storage has been so arranged that there will be scarcely any overflow from the dam and none at all during the summer. The river bed between the foot of the dam and the tailraces, a distance of about a mile, will as a consequence of the above be dry.

After an examination of all the conditions it was decided that the construction of a fishway would be impracticable, and it was accordingly decided to abandon this river. The West river, which flows into the same estuary, is still open for salmon, and it is thought probable that the East river run may ascend this water for spawning.

9. *North River, Victoria County.*—An examination was made of a falls 12 feet high on this river. The work involved will be the blasting out of rock at the head of the falls in order to improve the passage for salmon, which it is proposed to have done during the coming summer.

10. *Nictaux River, Annapolis County.*—Plans for fishways in the two dams on this river were served on the town of Middleton. Construction will not be completed until the coming summer.

#### NEW BRUNSWICK

11. *Mispec River, St. John County.*—Repairs were made to the fishway in the dam at the St. John city reservoir, involving new partitions. The walls of this fishery are of concrete.

12. *Nashwaak River, York County.*—The fishway built the previous year was only partially effective. The situation at this dam is a difficult one as the river below is entirely ledge rock practically level, and without any area of pools from which salmon could be led into a fishway. I suggested some improvements on my last inspection. Owing to the lateness of the season these could only be temporarily arranged but served to make the fishway fully effective. Some improvements were made to the fishway in the dam on this river at Stanley.

13. *Salmon River, Victoria County.*—Arrangements were completed and a new fishway built in the dam owned by Joseph Cote. The department extended and repaired the fishway in the Terrialt dam. In the two dams owned by the Davis Lumber Company repairs and extensions were carried out in the first and a new fishway built in the second one.

#### PRINCE EDWARD ISLAND

Surveys were conducted at dams on the Dunk, Morell, Wheatley, West and New Glasgow rivers, with a view to having fishways built to admit the ascent of salmon and sea trout. The former fish ascend the first two named rivers in some numbers, while sea trout run in practically all the larger streams on the island. As these dams have existed for a large number of years, some of them for several generations, and have never been required to install fishways, it was felt that none should be required unless the owners were agreeable. As a result of a conference with the various owners it is proposed next year to build fishways in the Dunk, Morell and New Glasgow rivers.

#### MANITOBA

*Whitemud River.*—Repairs were made to the fishways in the dams at Gladstone and Westbourne.

Both were inspected at a time when fish were ascending, and the latter found to be effective.

There is no evidence that the Gladstone one is not effective, although the overseer did not see any fish go through it.

Last spring at the time the fish were running, the river was high and large numbers went past the dams, but whether they used the fishways or were able to swim directly over the dams could not be ascertained. It will be impossible to obtain further information until the run of fish takes place this coming spring.

#### BRITISH COLUMBIA—REPORT OF J. McHUGH, Resident Engineer.

This report covers all the work performed under the superintendence of the engineers during the calendar year, and is again segregated under four separate headings, as follows:—

- (1) Removal of obstructions to the ascent of fish in streams and the construction and maintenance of fishways.
- (2) New construction and repairs to buildings at hatcheries, and local headquarters for fishery officers.
- (3) Surveys, both instrumental and otherwise, in connection with the location and development of hatchery sites and spawning areas.
- (4) General advisory work and the preparation of maps, plans and other data.

It will be noted that the actual expenditure in connection with the removal of obstructions is somewhat lighter than it has been in former years. Closer investigation of conditions, coupled with a wider knowledge of the requirements of this branch of the work has been of considerable assistance in analysing the various situations that have been, and are being met with from time to time.

It is also pleasing to note that as a result of the activities of the department in this branch of the work, logging operators are realizing that the depositing of refuse in streams will not be tolerated. Portions of two streams which were badly obstructed by loggers have this year been cleared at their own expense.

The obstructions dealt with during the year have consisted mainly of debris from logging operations and accumulations of rubbish from freshets which, from time to time, carry enormous quantities of logs and roots from upper waters to lodgment in those portions of stream beds in which the velocity of the stream is lightest.

The streams requiring the largest expenditure, and the amount spent on them during the past season, are as follows:—

Owen bay.....	\$854 26
Big Qualicum river.....	749 45
French creek.....	295 75
Call creek.....	474 00
Rosewall creek.....	130 00
Quatsi river.....	108 00
Koeye river.....	107 49

Of these streams, the Koeye river only requires special mention. At the foot of Koeye lake, the discharge enters the Koeye river over a fall probably thirty feet in height. The fall is divided naturally into two parts, that on the right hand being quite steep and totally impassible for salmon, and that on the left being more gradual and the route chosen by the fish when passing into the lake. A rocky point, being a continuation of the dividing line between the two falls, extends down stream a distance of probably a hundred feet or more, forming a pool at the base of the impassable fall in which fish collected in large numbers and destroyed themselves in their effort to surmount the obstacle. The first inclination to relieve the situation was to construct a low rock-filled timber dam at the head of the steep fall for the purpose of diverting all the head of the water over the passable fall, thus leaving the impassable fall dry.

This scheme was, however, later amended by the construction of a low wall of boulder rocks from three to five feet in height, built in the river bed below the fall from the point of the projecting ledge to the right bank of the stream. Bearing in mind the fact that during the salmon runs the discharge from the lake is comparatively light, this rock wall becomes a lead, guiding ascending fish into the proper channel, though at high water it will be completely submerged. This work cost considerably less money than the diversion would have cost, and is apparently quite satisfactory.

Smaller obstructions were likewise removed from the following streams, none of which, however, requires particular comment:—

Sucker creek,	Gates creek,
Schooner Passage,	Lardo river,
Salmon river,	Waskasco creek,
Capilano river,	Birkenhead river,
Owl creek,	Seymour creek,
Bella Coola river,	Little Qualicum river,
Skutz falls,	Wilson creek,
Deep Bay creek,	Oyster river,
Sproat falls,	Knouf lake.
Nimpkish river,	

There has been no further requirement during the year to the fishladders in the province, though consideration is, at the present time, being given to the question of reconstruction of the fishladder in the Adams River dam.

The greater proportion of the engineers' time during the season under review has been devoted to work in connection with repairs and additions to hatchery establishments and other fish cultural work, and to construction work in connection with the Biological Station at Departure Bay, the proposed new Biological Station at Prince Rupert, the new warehouse and marine ways at Poplar Island, and the new fishery overseer's wharf and quarters at Schooner Passage, Rivers inlet. While the two latter works were constructed under contracts awarded by the Public Works Department, the original plans and actual work in connection therewith were prepared by the department's own engineering staffs.

The following hatcheries were visited and the works as detailed performed during the year under review:—

*Pitt Lake Hatchery.*—The new hatchery at this point was completed during the year, and is proving very satisfactory, the greatly increased accommodation providing for what, so far, is the largest collection of sockeye eggs ever obtained at this point. The hatchery building, whilst built very substantially of hewn logs and roofed with shakes, was constructed at a very low cost—slightly less than \$3,000, and the cost of maintenance, on account of style of construction will be very light.

Heavy freshets during the month of January caused damaging floods in the vicinity of the hatchery, and it became necessary to do considerable work renewing that portion of the bed of Four Mile creek in the immediate vicinity of the hatchery, and to protect the banks with cribbing and riprap. A portion of the main road, about one thousand feet in length, south of the hatchery, which was completely demolished by floods two or three years previously, was restored by rebuilding on the edge of the rock bluff, thus affording a permanent roadway. This roadway at the edge of the bluff, is intersected by a channel which only fills at freshet time. This channel was partially filled with broken rock from the bluff, but it is feared that more work will, at some future date, have to be done here to give any degree of permanence to this portion.

*Rivers Inlet Hatchery.*—Extensive repairs and additions were performed at this establishment during the year. The repairs consisted of the entire

replacement of the foundations and floors of the hatchery building, and the construction of an entirely new equipment of troughs. The extensions consisted of the construction of a suite of rooms, dining and living rooms, three bedrooms and bath room, in the hatchery building on the second floor in the unused end of the building. This construction provides very suitable and comfortable living quarters for the officer in charge, and released the rooms formerly occupied by him for the remainder of the staff. Two additional rooms were also constructed at the same time for another of the married staff.

The extent of this work required a revision of transportation facilities, and considerable work was done on the trail in order to render it more readily passable for a one-ton Ford truck. This work resulted in haulage costs being cut down very considerably.

The total cost of the work at Rivers Inlet hatchery was slightly under seven thousand dollars.

*Skeena River Hatchery.*—All the buildings were painted both inside and out to conform with the new colour standard adopted by the department.

*Pemberton Hatchery.*—The main buildings were newly painted during the year. For the purpose of providing an alternative water supply to the hatchery, a survey was made with this end in view, and plans and estimates prepared for a supply from the Birkenhead river. The proposed new pipeline will be approximately three thousand (3,000) feet in length, and will provide an entirely independent supply.

*Cowichan Lake Hatchery.*—The buildings and fences were newly painted during the year.

*Harrison Lake Hatchery.*—The hatchery and mess house were newly painted during the year.

*Anderson Lake Hatchery.*—The residence of the officer in charge was raised a distance of two and one half feet in order to clear the floors, which, when the water was unusually high, were at times submerged.

*Kennedy Lake Hatchery.*—Considerable repairs were effected during the year, both roofs and foundations of the building, having been thoroughly repaired. The interior of the hatchery building was repainted and fifteen hatching troughs replaced.

*Babine Lake Hatchery.*—New sills and a new floor provided in the hatchery building during the year, and it will be necessary during the coming season to do considerable work on the foundations of this building.

In addition to all the foregoing a considerable amount of work has been performed on the district maps which are being kept up to date and extended.

## APPENDIX 4

LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1924.

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed
					cwt.
Actor.....	7	3	1	Sell fish.....	60
Adeline.....	6	2	1	" ".....	300
Akutan.....	46	14	8	Orders, sell fish.....	
Alaska.....	44	15	1	Sell fish.....	2,360
Albatross.....	40	13	5	Bait, sell fish, ice.....	740
Agnes.....	17	5	3	Sell fish, bait, ice.....	60
Alfa.....	12	5	6	Bait, ice.....	
Alco.....	37	7	1	Stores.....	
Alice.....	15	7	1	Bait, ice.....	
Alice B.....	13	5	8	Sell fish, bait, ice.....	200
Aloha.....	19	6	2	Sell fish, stores.....	460
Alten.....	43	15	1	Sell fish.....	3,960
American.....	25	13	5	Bait, ice.....	
Anna J.....	22	6	2	Sell fish, bait, ice.....	2,000
Antler.....	22	5	4	Bait, sell fish, ice.....	340
A. R. B.....	11	5	1	Stores.....	
Arcade.....	14	5	10	Bait, ice.....	
Arctic.....	29	6	1	Sell fish.....	1,720
Arro.....	15	3	1	Bait.....	
Atlantic.....	25	11	1	Sell fish.....	1,620
Atlas.....	31	7	1	" ".....	1,440
Augusta.....	19	5	1	" ".....	940
Aurora.....	16	5	8	Bait, ice.....	
Avona.....	9	3	1	Sell fish.....	100
Baltic.....	20	4	1	Sell fish.....	780
Baltimore.....	20	8	1	Bait and ice.....	
Beaver.....	17	5	8	Bait.....	
Bernice.....	4	2	1	Sell fish.....	60
Blue Bird.....	4	2	1	" ".....	20
Bonanza.....	30	6	1	" ".....	2,280
Bravo.....	10	3	1	" ".....	520
Brisk.....	37	7	3	Sell fish, bait and ice.....	2,460
Brothers.....	13	4	1	Sell fish.....	840
California.....	20	5	8	Sell fish, bait and ice.....	300
Cape Clear.....	14	5	12	Sell fish, bait and ice, orders.....	280
Carolene.....	18	6	1	Sell fish.....	400
Caroline.....	5	5	1	Water.....	
Cascade.....	7	2	2	Bait and ice.....	
Cedric.....	19	5	1	Sell fish.....	1,120
Chancellor.....	13	5	4	Sell fish, bait and ice.....	640
Chimera.....	9	3	8	Bait and ice.....	
Columbia.....	70	11	1	" ".....	
Columbia.....	41	8	1	Sell fish.....	3,000
Commonwealth.....	60	17	1	" ".....	2,140
Constitution.....	39	14	3	Sell fish, bait and ice.....	1,360
Cora.....	4	2	1	Sell fish.....	80
Corona.....	19	11	8	Bait, ice.....	
Crescent.....	8	4	3	Sell fish, bait and ice.....	640
Curlow.....	18	5	6	Bait, ice, orders.....	
Daily.....	26	6	2	Sell fish, bait and ice.....	2,740
Defence.....	20	5	1	" ".....	880
Democrat.....	27	6	1	" ".....	1,680
Discovery.....	10	4	10	" ".....	180
Diver.....	4	2	3	" ".....	40
Doll II.....	4	1	1	" ".....	
Dora H.....	15	5	7	Bait, ice.....	
Dubrovick.....	24	4	1	Sell fish.....	60
Eagle.....	67	16	2	" ".....	5,920
Eastern Point.....	4	3	1	" ".....	720
Edith.....	4	2	1	Bait.....	

List of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1924.—Continued.

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed
Eidsvold	15	5	3	Sell fish, bait.	cwt. 1,220
Eleanora	16	5	3	Bait.	1,220
Emblem	4	3	1	Sell fish.	120
E. Neilson	15	4	1	"	1,320
Enterprise	5	3	10	Bait and ice.	
Escapade	17	4	1	Water.	
Eureka	11	4	3	Bait and ice, orders.	
Evolution	17	5	11	Sell fish, bait and ice, orders.	240
Fairway	19	5	3	Sell fish, bait and ice.	240
Faith	7	3	6	"	160
F. C. Hergert	15	5	8	Bait and ice.	
Flamingo	13	5	4	"	
Flattery	19	5	1	Sell fish.	580
Foremost	66	15	1	"	1,680
Fortuna	21	5	8	" bait and ice.	60
Forward	18	5	3	"	1,120
Freia K945	4	2	1	In transit.	
Fremont	10	4	7	Sell fish, bait and ice.	186
Galveston	21	2	1	Bait.	
Genevive	4	2	1	Sell fish.	100
George T.	6	2	1	Water.	
Glacier	12	4	1	Sell fish.	740
Gladstone	23	6	1	"	1,980
Gladys	11	3	1	"	740
Goney	12	5	6	Sell fish, bait and ice, repairs, orders	740
Grayling	16	5	1	Sell fish.	520
Gretchen	7	3	12	Sell fish, bait and ice, water.	120
Groth	10	4	1	Sell fish.	960
Hanna	11	5	8	Bait and ice, orders.	
Happy	12	4	1	Sell fish.	360
Harding	19	5	6	Sell fish, bait and ice.	580
Harvester	15	5	7	Bait and ice.	
Hazel	7	3	1	Sell fish.	140
Hazel H.	24	5	5	Bait and ice.	
Helgeland	57	15	1	Sell fish.	4,440
Henry J.	19	5	2	Bait and ice.	
Hi Gill	11	4	1	Sell fish.	200
Hilda	10	3	1	"	80
Hillside II	28	8	1	Bait and ice.	
Imp	5	1	1	Supplies.	
Imperial	35	5	3	Sell fish, orders.	1,160
Ira	11	5	1	Ice and stores.	
Irene	8	3	3	Bait and ice.	
Ithona	20	6	7	Sell fish, bait and ice.	20
I. U. A. J.	9	3	1	In transit.	
Ivanhoe	27	6	2	Sell fish, bait and ice.	560
Jennie	16	5	5	Bait, ice, supplies.	
Jennie F. Decker	16	5	16	Sell fish, bait, stores, ice.	120
J. P. Todd I.	4	2	1	Sell fish.	380
J. P. Todd II.	12	5	1	"	140
Judith	5	3	5	Bait.	
Juliett	6	1	1	Bait and ice.	
June	15	5	1	Sell fish.	580
K. 78	4	2	1	"	
K. 365	4	1	1	Bait and ice.	
K. 447	5	2	1	"	
K. 512	5	2	1	"	
Kanatak	39	7	1	Sell fish.	3,200
Kodiak	38	13	8	Sell fish, bait and ice, orders.	1,980
Katy	4	3	2	Sell fish, bait and ice.	
Kattalla	16	5	6	"	280
L. 718	5	2	1	Bait and ice.	
Lancing	16	4	1	Sell fish.	580
La Paloma	14	11	7	Bait, ice.	
Laura	7	3	1	Sell fish.	60
Lebanon	14	5	8	Sell fish, bait and ice.	140
Lena	6	3	1	Ice and stores.	
Liberty	44	15	4	Sell fish, bait and ice.	1,800
Lincoln	23	6	1	"	1,020
Lincoln	4	3	1	"	200
Liyuya	30	7	2	"	1,880

LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1924.—Continued.

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed
Lonhelen.....	11	3	1	In transit.....	
Louisa.....	16	5	13	Bait, ice.....	
Louise.....	5	1	1	Supplies.....	
Lummen.....	10	4	1	Sell fish.....	460
Lyra.....	4	1	1	Shelter.....	
M. 819.....	5	2	1	Bait and ice.....	
Madeline J.....	21	5	11	Sell fish, bait and ice.....	240
Majestic.....	33	7	1	".....	2,240
Mankato.....	8	3	2	Bait and ice.....	
Marian.....	4	2	1	Sell fish.....	
Mariner.....	21	5	5	Sell fish, bait and ice, orders.....	680
Mars.....	9	4	1	Shelter.....	
Mary.....	16	8	18	Bait and ice.....	
Mary B.....	22	7	1	".....	
Maud Hazel.....	9	4	1	Sell fish.....	
Mecca.....	6	3	1	".....	100
Mermaid.....	10	5	9	" bait and ice.....	240
Middleton.....	24	6	1	".....	1,600
Mildred.....	19	5	8	Bait and ice.....	
Mildred II.....	12	5	1	".....	
Mildred II.....	31	6	2	Sell fish, bait.....	1,800
Mira.....	7	3	1	".....	80
Myrtle.....	9	3	6	Bait and ice.....	
National.....	20	6	6	Sell fish, bait and ice.....	960
Neptune.....	43	13	3	".....	780
New England.....	70	16	3	" overhaul.....	2,480
Nomad.....	15	5	8	" bait and ice.....	100
Norland.....	19	6	1	".....	260
Norma.....	6	3	3	" bait and ice.....	680
North.....	9	3	9	".....	1,400
Omaney.....	34	13	1	".....	3,420
Onah.....	18	5	3	" bait and ice.....	1,440
Orient.....	48	13	1	".....	2,120
Panama.....	34	15	5	" bait and ice.....	1,840
Pelican.....	17	5	1	".....	1,360
Pershing.....	18	5	10	Bait, ice.....	
Pioneer.....	48	13	1	Sell fish.....	1,440
Pioneer III.....	26	5	7	" bait and ice.....	2,840
Polaris.....	45	15	1	".....	2,640
Portlock.....	36	8	1	".....	1,320
Presho.....	14	5	7	" bait and ice.....	380
President.....	24	6	2	".....	2,320
Princess Pat.....	27	3	1	Bait and ice.....	
Prosperity.....	25	6	2	Sell fish, bait and ice.....	1,200
Puffin.....	18	4	1	Water.....	
Radio.....	63	15	1	Sell fish.....	3,760
Rainbow.....	4	2	1	".....	
Ranier.....	39	6	1	".....	3,860
Ranier.....	4	3	1	".....	740
Raven.....	4	2	1	".....	20
Reliance.....	18	4	1	".....	1,480
Reliance.....	14	4	1	".....	100
Reliance.....	11	3	3	" water.....	880
Reliance.....	8	3	2	" bait and ice.....	1,100
Republic.....	51	15	1	".....	3,880
Resolute.....	47	13	2	".....	3,660
Restitution.....	24	5	2	Bait and ice.....	
Road Amundsen.....	16	6	1	Sell fish.....	1,800
Rosita.....	8	5	1	Stores and ice.....	
Rosario.....	16	5	12	Bait and ice.....	
Royal.....	15	5	8	Sell fish, bait and ice, orders.....	420
Roosevelt.....	13	5	13	Bait and ice.....	
Ruth, M.....	5	1	4	Supplies.....	
Sadie K.....	13	5	2	Sell fish, bait and ice.....	1,300
Sammy.....	8	3	3	Bait.....	
Scandia.....	79	17	1	Sell fish.....	4,740
Seattle.....	55	16	5	" bait and ice.....	2,080
Senator.....	11	6	1	".....	2,260
Sentinel.....	21	6	1	".....	1,720
Seymour.....	44	15	2	" bait and ice.....	3,660
Sherman.....	18	5	1	".....	1,520

List of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1924.—Continued.

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed
Sirius.....	17	4	1	Sell fish.....	cwt. 280
Sitka.....	50	15	1	".....	2,720
Spencer.....	17	5	3	Water, orders.....	
Spray.....	20	5	5	Sell fish, bait and ice.....	420
Star.....	12	4	1	".....	220
Star.....	7	3	12	"..... bait and ice, stores.....	280
Summer.....	34	15	2	Sell fish, bait and ice.....	3,800
Sunset.....	37	7	1	".....	3,860
Sun Wing.....	15	4	1	".....	120
Superior.....	26	6	1	".....	1,820
Superior.....	18	5	10	Bait.....	
Swan.....	9	4	7	Bait and ice, sell fish, orders.....	60
T. 915.....	4	2	1	Sell fish.....	40
Tahoma.....	18	7	2	"..... bait and ice.....	2,120
Taku II.....	10	3	1	".....	
Tars.....	28	13	1	Bait and ice.....	
Tatoosh.....	21	6	2	Sell fish.....	1,740
Tatoosh.....	7	1	4	Bait and ice.....	
Teddy J.....	13	4	1	Sell fish.....	940
Texas.....	16	5	10	"..... bait and ice.....	160
Thelma II.....	26	5	6	".....	240
Tillikum.....	21	5	12	"..... stores.....	420
Tom & Al.....	57	15	2	Sell fish, bait and ice.....	1,500
Toss.....	28	9	1	Stores.....	
Trio.....	19	5	2	Sell fish, water.....	60
Tyee.....	12	4	1	".....	740
Tordenskjold.....	39	13	4	"..... bait and ice.....	2,120
Unimak.....	22	5	9	Bait and ice.....	
Urania.....	27	6	1	Sell fish.....	320
Uranus.....	15	5	3	"..... bait and ice.....	1,100
Valid.....	8	3	6	Sell fish, bait and ice, water.....	80
Valorous.....	21	5	2	".....	1,520
Vansee.....	58	16	1	".....	3,380
Velero.....	6	2	8	Bait and ice.....	
Velva.....	6	3	4	".....	
Venus.....	25	7	1	Sell fish.....	2,600
Venus.....	23	7	1	Bait and ice.....	
Venus.....	4	3	1	Sell fish.....	960
Vesta.....	13	5	2	"..... bait and ice.....	1,100
Viking.....	11	4	1	".....	420
Virginia.....	33	6	1	".....	600
Volunteer.....	19	7	8	".....	1,115
Wabash.....	6	3	1	Sell fish.....	820
Washington.....	15	4	2	"..... bait and ice.....	680
Wave.....	7	3	2	".....	440
Western.....	41	7	1	".....	2,960
Wesley.....	9	3	10	Bait and ice.....	
White Star.....	17	4	2	Sell fish, bait and ice.....	450
Wilhelmina.....	17	5	10	Bait and ice.....	
Wilson.....	10	5	7	Sell fish, bait and ice.....	600
Wireless.....	19	5	2	".....	940
Wizard.....	49	8	1	".....	2,700
Woodrow.....	23	5	5	".....	440
Westford.....	17	5	7	".....	600
Yakutat.....	41	13	9	".....	1,180
Yellowstone.....	22	6	2	".....	1,160
Yukon.....	31	6	1	".....	920
Young America.....	22	6	1	".....	820

## APPENDIX 5.

The following is a statement of the different kinds of licenses issued by the different inspectors, during the 1924-25 season:

## MAGDALEN ISLANDS, QUEBEC—Inspector S. T. GALLANT

Kind of Licenses—	Number of Licenses Issued
Lobster fishing licenses.....	524
Lobster packing licenses.....	20
Lobster packing extensions—10.....	
Herring trap-net licenses (No. 52 cod trap-net).....	22
Herring seine licenses.....	24
Smelt bag-net licenses.....	1
	<hr/> 591

## PRINCE EDWARD ISLAND—Inspector S. T. GALLANT

Lobster fishing licenses.....	2,164
Lobster packing licenses.....	149
Lobster packing extensions—53.....	
Oyster fishery licenses.....	252
Quahog fishery licenses.....	2
Fish cannery licenses.....	5
Certificates under Sec. 63—5.....	
Trap-net licenses.....	3
Smelt gill-net licenses.....	314
Smelt bag-net licenses.....	281
	<hr/> 3,170

## NOVA SCOTIA—DISTRICT No. 1—Inspector A. G. McLEOD

Lobster fishing licenses.....	2,049
Lobster packing licenses.....	43
Lobster packing extensions—11.....	
Oyster fishery licenses.....	114
Fish cannery licenses.....	4
Certificates under Sec. 63—57.....	
Trap-net licenses.....	46
Salmon gill-net or drift-net licenses.....	28
Salmon trap-net, pound-net or weir.....	157
Angling permits.....	57
Lobster pound certificates—5.....	
Smelt gill-net licenses.....	296 (45 cancelled)
Smelt bag-net licenses.....	54
Lobster pound licenses.....	1
	<hr/> 2,854 (45 cancelled)

## NOVA SCOTIA—DISTRICT No. 2—Inspector D. H. SUTHERLAND

Lobster fishing licenses.....	2,784 (1 cancelled)
Lobster packing licenses.....	66
Lobster packing extensions—16.....	
Oyster fishery licenses.....	95
Fish cannery licenses.....	5
Shad gill-net or drift-net licenses.....	20
Certificates under Sec. 63—108.....	
Seine licenses.....	201
Herring weirs.....	17
Trap-net fishing licenses.....	138
Salmon gill-net or drift-net licenses.....	302
Salmon trap-net, pound-net or weir.....	133
Angling permits.....	42
Lobster pound certificates—464 (1 cancelled).....	
Smelt gill-net licenses.....	336 (1 cancelled)
Smelt bag-net licenses.....	236
Scallop fishery licenses.....	6
Lobster pound licenses.....	4
	<hr/> 4,385 (2 cancelled)

## NOVA SCOTIA—DISTRICT No. 3—Inspector H. H. MARSHALL

Kind of Licenses— <i>Continued</i>	Number of Licenses Issued
Lobster fishing licenses.....	3,064 (1 cancelled)
Lobster packing licenses.....	29
Lobster packing extensions—13.....	
Shad gill-net or drift-net licenses.....	2
Fish cannery licenses.....	8
Certificates under Sec. 63—151 (1 spoiled).....	
Herring weir licenses.....	77 (1 cancelled)
Trap-net licenses.....	205
Salmon net permits (Medway R.).....	12
Angling permits.....	374 (1 destroyed)
Salmon gill-net or drift-net licenses.....	239
Salmon trap-net, pound-net or weir.....	63
Lobster pound certificates—100 (1 cancelled).....	
Smelt gill-net licenses.....	89
Smelt bag-net licenses.....	39
Scallop fishery licenses.....	191 (10 cancelled)
Lobster pound licenses.....	8
Lease of Long Beach pond—1.....	
	<hr/>
	4,400 (12 cancelled and 1 destroyed)

## NEW BRUNSWICK—DISTRICT No. 1—Inspector J. F. CALDER

Lobster fishing licenses.....	589
Shad gill-net or drift-net licenses.....	53
Fish cannery licenses.....	7
Certificates under Sec. 63—5.....	
Clam permits.....	115
Salmon gill-net or drift-net licenses.....	76
Herring seine licenses.....	Nil
Lobster pound certificates—24.....	
Smelt gill-net licenses.....	1
Smelt bag-net licenses.....	Nil
Scallop fishery licenses.....	27
Lobster pound licenses.....	3
Lease of Dark Harbour—1.....	
Herring weir licenses.....	619
	<hr/>
	1,490

## NEW BRUNSWICK—DISTRICT No. 2—Inspector A. L. BARRY

Lobster fishing licenses.....	2,150
Lobster packing licenses.....	143
Lobster packing extensions—48.....	
Oyster fishery licenses.....	700
Quahaug fishery licenses.....	138
Shad gill-net or drift-net licenses.....	23
Fish cannery licenses.....	2
Certificates under Sec. 63—169.....	
Herring weir licenses.....	Nil
Salmon net permits.....	39
Gaspereau pound-net or trap-net.....	28
Salmon gill-net or drift-net licenses.....	55
Salmon trap-net, pound-net or weir.....	369
Lobster pound certificates—450.....	
Smelt gill-net licenses.....	199
Smelt bag-net licenses.....	4,653
Scallop fishery licenses.....	Nil
Lobster pound licenses.....	7
Bass fishery licenses.....	130
	<hr/>
	8,636

## NEW BRUNSWICK—DISTRICT No. 3—Inspector H. E. HARRISON

Shad gill-net or drift-net licenses.....	221
Sturgeon fishery licenses.....	12
Whitefish fishery licenses.....	1
Salmon net permits.....	119
Salmon gill-net or drift-net licenses.....	110
Smelt gill-net licenses.....	6
Smelt bag-net licenses.....	1
Bass fishery licenses.....	12
	<hr/>
	482

## MANITOBA—Inspector J. B. SKAPTASON

Kind of Licenses—Continued	Number of Licenses Issued
Commercial sturgeon fishery licenses.....	215
Domestic sturgeon fishery licenses.....	13
Pound-net licenses.....	22
Special angling permits.....	118
Special fishery licenses.....	2,460 (1 cancelled)
Settler's permits.....	1,031
Receipt books—5.....	

3,859 (1 cancelled)

## SASKATCHEWAN—Inspector G. C. MACDONALD

Commercial sturgeon fishery licenses.....	5
Domestic sturgeon fishery licenses.....	11
Angling permits.....	376
Commercial and fisherman's licenses.....	835 (1 cancelled)
Domestic fishery licenses.....	97 (2 cancelled)
Indian and Halfbreed permits.....	817
Receipt books—51.....	

2,141 (3 cancelled)

## ALBERTA—Inspector R. T. RODD

Fish cannery licenses.....	Nil
Angling permits.....	3,952 (10 cancelled)
Indian and Halfbreed permits.....	449
Commercial and fisherman's licenses.....	902 (1 cancelled)
Domestic fishery licenses.....	134 (13 cancelled)
Receipt books—469.....	(4 cancelled)

5,437 (24 cancelled)

## YUKON TERRITORY

Special fishery licenses.....	26
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## MODUS VIVENDI LICENSES

Pacific Coast.....	221
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## PROVINCE OF BRITISH COLUMBIA—Inspector J. A. MOTHERWELL

Fish cannery licenses.....	13
Certificate under Sec. 63—Nil.....	
Special angling permits.....	7
Abalone fishery licenses.....	1
Indian permits.....	75
Reduction works licenses.....	7
Salmon fishery licenses.....	3,560
Salmon trolling licenses.....	1,533 (3 cancelled)
Salmon trap-net licenses.....	6
Salmon purse-seine licenses.....	227
Salmon drag-seine licenses.....	32
Capt. salmon seine boat licenses.....	178 (4 cancelled)
Salmon curing licenses.....	64 (3 cancelled)
Salmon cannery licenses.....	62
Boat licenses.....	203 (2 cancelled)
Fish buyer's licenses.....	77 (1 cancelled)
Grayfish fishery licenses.....	143
License to assistant operator of salmon (purse or drag) seine.....	949 (1 cancelled)
License to assistant in a boat used in operating salmon gill-net or drift net.....	1,007
Cod fishery licenses.....	314
Metal tags.....	8
Crab fishery licenses.....	127 (1 cancelled)
Smelt or sardine fishery licenses.....	57
Sturgeon fishery licenses.....	2
Miscellaneous licenses.....	236 (2 cancelled)
Herring or pilchard gill-net or drift net licenses.....	40
Herring drag-seine licenses.....	3
Herring purse-seine licenses.....	39 (1 cancelled)
License to captain of herring seine boat.....	38 (1 cancelled)
Herring curing licenses.....	27
Whale factory licenses.....	3
Counterfoil of pelagic sealing certificates.....	19

9,077 (19 cancelled)

Total..... 46,769 (106 cancelled  
1 destroyed)

The following is a statement of the total number of prosecutions and confiscations that took place during the 1924-25 season:

	Prosecutions		Confiscations	
Prince Edward Island.....		41		15
Nova Scotia No. 1.....	11		26	
"    No. 2.....	29		113	
"    No. 3.....	24	64	38	177
New Brunswick No. 1.....	21		54	
"    No. 2.....	43		121	
"    No. 3.....	41	105	30	205
Manitoba.....		48		105
Saskatchewan.....		93		74
Alberta.....		21		18
British Columbia No. 1.....	49		34	
"    No. 2.....	35		9	
"    No. 3.....	13	97	14	57
		469		651



DOMINION OF CANADA

FIFTY-NINTH

ANNUAL REPORT

OF THE

# FISHERIES BRANCH

Department of Marine and Fisheries

FOR THE YEAR

1925-26



OTTAWA  
F. A. ACLAND  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
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DOMINION OF CANADA

FIFTY-NINTH

ANNUAL REPORT

OF THE

FISHERIES BRANCH

Department of Marine and Fisheries

---

FOR THE YEAR

1925-26



OTTAWA  
F. A. ACLAND  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
1926



CONFIDENTIAL

To General His Excellency the Right Honourable Lord Byng of Vimy, G.C.B.,  
G.C.M.G., M.V.O., Governor General and Commander in Chief of the  
Dominion of Canada.

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of your Excellency  
and the Parliament of Canada, the Fifty-ninth Annual Report of the Fisheries  
Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

P. J. A. CARDIN,

Minister of Marine and Fisheries.

DEPARTMENT OF MARINE AND FISHERIES,

OTTAWA, July, 1926.

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## DEPUTY MINISTER'S REPORT

To the Hon. P. J. A. CARDIN,  
Minister of Marine and Fisheries.

SIR,—I have the honour to submit the Fifty-ninth Annual Report of the Fisheries Branch of the Department, which is for the fiscal year ended March 31, 1926.

The report deals with the following subjects:—

Review of the Fisheries of 1925.  
Operation of the Fish Inspection Act.  
The Inspection of Canneries and Canned Fish.  
Fisheries Intelligence Service.  
Fishing Bounty.  
Fish Culture.  
North American Committee on Fisheries Investigation.  
Pacific Halibut Treaty.  
Marine Biological Board.  
Natural History Observations.

Appendices to the Report include the following:—

Report of Inspectors of Fisheries.  
Report on Activities of Marine Biological Board.  
Observations on the American Lobster.  
Fishways and Removal of Obstructions.  
Fisheries Expenditure and Revenue.  
Entries of United States Fishing Vessels.  
Summary of Licenses Issued.

### REVIEW OF THE FISHERIES OF 1925

The total production of the fisheries of Canada during the year under review was greater than during the preceding year and the marketed value was almost \$3,500,000 greater.

In the following table will be seen the marketed value by provinces with a comparison of the previous year:—

	1925	1924
Nova Scotia.....	\$ 10,213,687	\$ 8,777,251
New Brunswick.....	4,798,589	5,383,286
Prince Edward Island.....	1,598,119	1,201,772
Quebec.....	3,044,919	2,283,314
Ontario.....	3,436,412	3,557,587
Manitoba.....	1,466,939	1,232,563
Saskatchewan.....	479,645	482,492
Alberta.....	458,504	339,107
British Columbia.....	22,414,618	21,257,567
Yukon Territory.....	15,370	18,773
	47,926,802	\$ 44,534,235

The increased value for Nova Scotia of about \$1,500,000 is accounted for by the greatly increased catches in cod and lobsters.

In the province of New Brunswick decreases are noted in the catches of cod, sardines, and smelts, with a corresponding drop in the value.

The catches of cod, herring and lobsters in the province of Prince Edward Island were larger in 1925 and caused the value to be higher.

There was a considerable increase in the catch and value of cod in the province of Quebec, while the salmon and lobster catches were also greater.

In Ontario and Saskatchewan the catches were about the same as in the preceding year, while in Manitoba there were greater catches of whitefish and tullibee. The increase in Alberta was due to greater catches of pickerel, pike and whitefish.

British Columbia shows an increase in value of over a million dollars which is accounted for by a larger catch of herring and an increase in the marketed value of salmon.

#### ATLANTIC COAST

*Cod, Haddock, Hake and Pollock.*—There were 2,872,281 cwts. of these fish taken, compared with 2,433,234 cwts. in 1924. Each of these kinds, with the exception of hake, shows an increased catch in Nova Scotia. In New Brunswick the cod catch shows a decrease, but in the other three kinds an increase. Prince Edward Island and Quebec returns each give an increased catch of cod of about 50 per cent. The quantity marketed in a fresh state (including fresh fillets) was 306,860 cwts., compared with 331,421 cwts. in the previous year, while there were 103,116 cwts. of smoked prepared (including smoked fillets), compared with 78,287 cwts. in 1924.

The Lunenburg banking fleet had a very successful season. There were ten more vessels added to the fleet during the year. There are now ten steam trawlers operating out of Nova Scotian ports, and these supply mainly the demand for fresh fish.

*Mackerel, Herring and Sardines.*—The catch of these three kinds amounted to 1,428,155 cwts., as compared with 1,600,179 cwts. in the preceding year. A drop of some 60,000 cwts. in the catch of herring in Nova Scotia was more than offset by increases in the other three provinces so that the total catch of 923,428 cwts. is greater than that of 1924 by 78,967 cwts. The quantity of herring smoked again shows an increase, some 89,404 cwts. being prepared in this manner as against 71,366 cwts.

The catch of mackerel was 187,661 cwts., which is less than that of the previous year by 27,929 cwts. While the total catch was less, the catch for Nova Scotia was the second largest since 1910. The marketed value of the catch was poor owing to the American market being well stocked by their own fishermen.

There were 158,533 barrels of sardines taken, compared with 270,064 barrels in the previous year. There was a heavy run of these fish on the Maine coast which were sold by the Maine fishermen at a comparatively low price; hence the demand for Canadian fish was not as keen as it otherwise would have been.

*Other Sea Fish.*—There were 21,767 cwts of halibut taken, which is a slight decrease from the previous year. The catch of swordfish was 4,551 cwts., which is less than in 1924. Some 16,606 cwts. of tomcod and 11,893 cwts of flounders were caught. This is a slight increase in the case of the former and nearly double the quantity in the latter instance.

## FISHERIES BRANCH

*Shellfish.*—The increase in the catch of lobsters is very noticeable. There were 340,838 cwts. taken compared with 272,213 cwts. in 1924. The catch and its disposal by provinces was as follows:—

1925	Catch	Catch in shell	Marketed canned
	cwt.	cwt.	cases
Nova Scotia.....	170,698	63,525	53,745
New Brunswick.....	65,894	10,991	27,236
Prince Edward Island.....	78,570	10,272	34,121
Quebec.....	25,676	1,313	12,395

1924

Nova Scotia.....	115,275	34,550	40,831
New Brunswick.....	68,303	26,024	23,548
Prince Edward Island.....	65,893	6,650	26,814
Quebec.....	22,742	1,025	10,925

There were 19,960 barrels of oysters taken compared with 27,319 barrels in the previous year.

Clams and quahaugs also show a falling-off, some 28,459 barrels being dug compared with 40,327 barrels in the preceding year. There were 17,718 barrels of scallops landed which is an increase of 7,368 barrels.

*River Spawning Fish.*—The catch of salmon was 57,352 cwts. compared with 57,561 cwts. in the previous year.

The quantity of smelts taken dropped from 88,296 cwts. to 75,457 cwts. The catch of these fish in New Brunswick shows a big decrease.

There were 56,781 cwts. of alewives taken, compared with 31,401 in 1924. The catch in Nova Scotia was more than double that of the previous year, while that in New Brunswick gives a good increase.

### INLAND FISHERIES

The catch of whitefish was 186,648 cwts., compared with 167,706 cwts. in 1924. The province of Ontario was the only one to show a decrease in the catch.

There were 86,877 cwts. of pickerel landed, compared with 101,610 cwts. in the previous year. In addition, some 34,453 cwts. of blue pickerel were landed in the province of Ontario. This quantity is slightly greater than that landed in 1924.

Some 45,555 cwts. of herring were landed in Ontario, compared with 125,013 cwts. in the year previous.

### PACIFIC FISHERIES

The fishing industry on the Pacific coast, which produces nearly half the total value for the whole of Canada, was again successfully prosecuted and the results show an increase of about a million and a quarter dollars.

*Salmon.*—There was a catch of 1,873,376 cwts. compared with 1,965,159 cwts. in 1924. The number of cases canned was 1,720,622, compared with 1,747,505 in the year previous. Owing to higher prices obtaining, however, the

value of the production in this one variety was \$14,973,885 or nearly two million dollars more than in 1924.

There were 392,545 cases of sockeye packed, or an increase of 22,944 cases. The largest pack was that of chums 607,337 cases compared with 570,497 cases in the previous year.

*Halibut.*—The catch of halibut was 318,240 cwts., which is somewhat less than that of the year previous, when some 331,382 cwts. were landed. The value of this fishery declined considerably due chiefly to the cold storage holdings, the latter having been held for the close season with the expectation of considerably increased prices, which failed to materialize.

*Herring.*—There were 1,437,875 cwts. of herring landed, compared with 1,157,625 cwts. in 1924. Of the catch there were 1,083,174 cwts. dry salted. This is the largest pack on record for the Pacific province.

*Pilchards.*—The catch was 318,973 cwts. compared with 27,485 cwts. in 1924. The large increase is due to the fact that pilchards were allowed to be processed in reduction works' plants for the first time. There were 495,653 gallons of oil and 2,083 tons of meal produced on the west coast of Vancouver Island from these fish.

*Whales and Seals.*—The operations of the whaling company were not as successful as in 1924, the number of whales caught falling from 415 to 351. The number of fur seals taken was 4,465 compared with 2,232 in the previous year.

### INSPECTION OF FISH

The inspection of certain kinds of fish, and the packages in which they are marketed, is carried on under authority of the Fish Inspection Act. The Act makes it necessary for packers to have both fish and barrels in accordance with its requirements and empowers Inspectors to examine such whenever and wherever it is necessary and convenient.

The work was carried on during the year 1925-26 with a staff of two permanent and twelve temporary inspectors on the Atlantic coast and two temporary inspectors on the Pacific coast. On the Atlantic coast during the year there were inspected over fifty-two packages of various kinds containing salted herring, mackerel, alewives and salmon. There were also inspected 62,000 boxes of smoked herring which were prepared for export. In addition to these 80,000 empty barrels were examined to ascertain whether they were up to the standard required by the Act before they passed into the hands of the packers.

On the Pacific coast the large and very important trade in dry salted herring between British Columbia and China was supervised by the department's inspectors. Provided the container is of standard size and filled to capacity with fish that are properly cured a certificate to that effect is issued by the inspector to the shipper of each shipment and the inspection system is now so satisfactory to shippers that they would not think of making a shipment without the official certificate. During the year under review 290,000 boxes of dry salted herring, each containing four hundred pounds, were inspected.

Under this system of inspection the quality of the cured articles on both coasts is being rapidly improved. The greatest and probably the most important improvement of all is in the quality and strength of the barrels that are now being made all over the Atlantic coast, which alone would seem to justify the institution of our inspection system.

## INSPECTION OF CANNERIES AND CANNED FISH

The inspection of fish canneries of all kinds throughout Canada, the raw material to be used therein and the process of canning the product and the labelling and marking of the cans was carried on during the year 1925-26 as previously under the provisions of the Meat and Canned Foods Act. This inspection is carried on by the department's staff of fishery overseers as part of their regular duties. There are between six and seven hundred canneries, large and small, canning fish of various kinds on the Atlantic and Pacific coasts. As a result of the inspection that has been conducted for several years there is a marked improvement not only in the conditions under which canning operations are carried on from the sanitary point of view but in the quality of the canned product as well. Defective buildings and equipment are being constantly rectified and improved at the instigation of the inspecting officers.

## FISHERIES INTELLIGENCE SERVICE

Under this service there was carried on during the season of 1924:—

1. The collection of monthly statistics of the sea fisheries, and the compilation of such in a summarized form for publication through the press each month.
2. The publication of a quarterly bulletin containing the statistics in detail. The bulletin is distributed to the trade and all directly concerned. The statistics are practically all collected by the regular fishery officers while performing their other duties as such and at very little additional cost.
3. The collection of information concerning supplies of bait day by day along certain stretches of the coast during the spring and summer months. The information is gathered by the officers of the department, who send it by telegram daily to certain ports where it is posted up for the information of masters of fishing vessels and those looking for bait.

## FISHING BOUNTY

Under the authority of "An Act to encourage the development of the Sea Fisheries and the building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the department and paid to fishermen of the maritime provinces. The bounty is distributed under regulations made from time to time by the Governor in Council.

For the year 1925, payment was made on the following basis:—

To owners of vessels entitled to receive bounty—\$1 per registered ton, payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty—\$8 each.

To owners of boats measuring not less than 13 feet keel—\$1 per boat.

To boat fishermen entitled to receive bounty—\$6.30 each.

There were 9,979 bounty claims paid. In the preceding year there were 10,104 bounty claims paid.

The total amount paid was \$159,984.80 allocated as follows:—

To 540 vessels and their crew.....	\$ 41,948 30
To 9,439 boats and their crew.....	118,036 50

## FISHING BOUNTY EXPENDITURE FOR 1925-26

County	Boats	Men	Amount	Vessels	Tons	Average tons	Men	Amount	Total amount
			\$ cts.					\$ cts.	\$ cts.
<i>Nova Scotia</i>									
Annapolis.....	141	256	1,753 80	1	44	44	10	124 00	1,877 80
Antigonish.....	131	200	1,391 00						1,391 00
Cape Breton.....	315	581	3,979 35	24	399	17	93	1,143 00	5,122 35
Cumberland.....	1	1	7 30						7 30
Digby.....	331	584	4,010 90	4	95	12	21	263 00	4,273 90
Guysboro.....	554	774	5,465 25	28	463	17	133	1,527 00	6,992 25
Halifax.....	945	1,246	8,798 85	68	924	14	275	3,124 00	11,922 85
Inverness.....	193	600	3,969 05	9	117	13	43	461 00	4,430 05
Kings.....	31	47	327 10						327 10
Lunenburg.....	479	591	4,203 00	123	6,570	53	1,621	19,538 00	23,741 00
Pictou.....	25	34	239 20						239 20
Queens.....	133	218	1,509 00	13	226	17	80	866 00	2,375 00
Richmond.....	343	647	4,419 45	22	373	17	90	1,093 00	5,512 45
Shelburne.....	459	913	6,212 55	16	389	24	127	1,405 00	7,617 55
Victoria.....	277	430	2,986 35	7	103	14	29	335 00	3,321 35
Yarmouth.....	134	304	2,049 20	8	454	57	112	1,350 00	3,399 20
Total.....	4,492	7,426	51,321 35	323	10,157	31	2,634	31,229 00	82,550 35
<i>New Brunswick</i>									
Charlotte.....	255	448	3,086 75	2	13	6	2	48 30	3,135 05
Gloucester.....	249	692	4,617 35	200	3,036	15	871	10,007 00	14,624 35
Kent.....	54	95	652 50						652 50
Northumberland.....				1	21	21	6	69 00	69 00
Restigouche.....	1	2	13 60						13 60
St. John.....	33	47	329 80						329 80
Total.....	592	1,284	8,700 00	203	3,070	15	879	10,124 30	18,824 30
<i>Prince Edward Island</i>									
Kings.....	384	532	3,739 80	3	41	13	6	89 00	3,828 80
Prince.....	413	759	5,129 00	2	22	11	5	62 00	5,191 00
Queens.....	111	244	1,650 90						1,650 90
Total.....	908	1,535	10,519 70	5	63	12	11	151 00	10,670 70
<i>Quebec</i>									
Bonaventure.....	392	745	5,093 55	2	23	11	5	63 00	5,156 55
Gaspé.....	2,293	4,847	32,838 80	7	125	18	32	381 00	33,219 80
Saguenay.....	658	1,226	8,398 60						8,398 60
Matane.....	104	168	1,164 50						1,164 50
Total.....	3,447	6,986	47,495 45	9	148	16	37	444 00	47,939 45
Grand total.....	9,439	17,231	118,036 50	540	13,437	25	3,561	41,948 30	159,984 80

## FISH CULTURE

Canada since confederation has always held a foremost place in fish culture, and at the present time its fish cultural service is second only to that of the Federal Government of the United States. It is operating thirty-three main hatcheries, six subsidiary hatcheries, four salmon-retaining ponds and one eyeing station.

The output from these establishments during 1925 was 707,273,319, as shown by the species in the following statement:—

STATEMENT, BY SPECIES, OF THE FISH AND FISH EGGS DISTRIBUTED FROM THE HATCHERIES DURING THE YEAR ENDED DECEMBER 31, 1925

Species	Eyed eggs	Fry	Advanced fry	Fingerlings	Yearlings and older fish	Total distribution
<i>Salmo salar</i> —Atlantic salmon	732,800	8,763,898	7,336,000	7,907,460	4	24,740,162
<i>Salmo irideus</i> —Rainbow trout	35,000	366,000	39,500	106,455		546,955
<i>Salmo Clarkii</i> —Cutthroat trout	119,890	604,426		8,807		733,123
<i>Salmo rivularis</i> —Steelhead salmon		157,625		10,811		168,436
<i>Salmo rivularis kamloops</i> —Kamloops trout	2,020,500	276,910		2,124		2,299,534
<i>Salmo trutta levenensis</i> —Loch leven trout		474,350	212,000	20,654		707,004
<i>Salmo fario</i> —Brown trout		74,570		33,930		108,500
<i>Oncorhynchus nerka</i> —Sockeye salmon	35,524,500	53,081,025	1,450,260	9,248,789		99,304,574
<i>Oncorhynchus tshawytscha</i> —Spring salmon	1,337,925	644,393		253,157	4	2,235,479
<i>Oncorhynchus kisutch</i> —Coho salmon	54,000	118,500				172,500
<i>Oncorhynchus keta</i> —Chum salmon	207,000					207,000
<i>Salvelinus fontinalis</i> —Speckled trout	1,183,000	893,829	617,500	1,803,746	151	4,498,226
<i>Coregonus clupeiformis</i> —Whitefish		435,133,050				435,133,050
<i>Cristivomer namaycush</i> —Salmon trout		10,535,472	5,053,000	2,563,441		18,151,913
<i>Argyrosomus arcti</i> —Cisco		11,199,755				11,199,755
<i>Stizostedion vitreum</i> —Pickerel		105,715,000		900		105,715,900
<i>Perca flavescens</i> —Yellow perch		1,350,000				1,350,000
<i>Micropterus dolomieu</i> —Black bass				308		308
<i>Pomoxis annularis</i> —Crappie				900		900
	41,214,615	629,388,803	14,708,260	21,961,482	159	707,273,319

NORTH AMERICAN COMMITTEE ON FISHERIES INVESTIGATIONS

This committee continues to perform excellent services at practically no cost to the Governments represented thereon. The committee was created in 1921 and now consists of three representatives each of the fisheries services of Canada and the United States and one each of Newfoundland and France. Its duty is to determine what general fishery investigations should be undertaken in areas in which two or more of the Governments represented are interested and to arrange for co-operation in carrying such out,—thus avoiding needless duplication,—and co-ordinating and correlating the results. It usually meets twice each year, once in the spring when the work to be undertaken during the summer is decided upon, and once in the fall, when the results are considered and arrangements are made for their co-ordination and correlation. The spring meeting of 1925 was held in New York and the fall meeting in Montreal.

The work mainly conducted during the year was a continuation of the study of the life-history of cod, haddock and mackerel. A large number of fish, principally cod and mackerel, were tagged in both Canada and the United States,

in order that their movements might be followed. Ocean temperatures and currents and their effect on the movement of fish both directly and indirectly are also being studied. Intensely interesting results are being obtained and it is anticipated that detailed reports on some of these matters will be published shortly.

#### PACIFIC HALIBUT TREATY AND INTERNATIONAL COMMISSION APPOINTED THEREUNDER

Off the Pacific coast of this continent there is what is by far the greatest halibut fishery in the world, though its potentialities have been seriously minimized by overfishing. The fishery from both Canadian and United States ports still continues to produce from fifty to fifty-five million pounds, dressed weight, per year.

This fishery was begun in a commercial way in 1888, when a fishing schooner from Gloucester, Massachusetts, lured by reports of abundance of halibut on the Pacific coast, made its way to Seattle, via cape Horn. During the first few years the industry had a struggle for existence, not because of lack of fish, as they proved to be in great abundance, but owing to inadequate and expensive marketing facilities, the markets of importance all being east of the Mississippi river. By 1892 these facilities were greatly improved, and the business began to grow rapidly. The first fishing was conducted off cape Flattery and the west coast of Vancouver island, but it soon was extended to Hecate strait, where fish of the very best quality were found to be so wonderfully plentiful that a vessel could take a full load of 300,000 pounds in two or three days of favourable weather. At that time only the fish of desirable size were retained. As Vancouver offered equally good rail facilities for shipping fish to the eastern markets, as did Seattle, and as it was considerably nearer the fishing banks the New England Fish Company, which for some time had been operating from Seattle, established a base in Vancouver in 1894, and the fishery from that port expanded rapidly.

Owing to its attractive appearance, its flavour, firm texture, excellent keeping qualities and the slight waste as well as little trouble in handling it in a retail way the demand for halibut grew rapidly both in Canada and the United States. Hence the fishery became more and more intensive and by 1914 all the nearby areas showed the result of overfishing. Consequently new producing areas were being sought and the fishery was extended more and more to the north and west, until now it is conducted as far west as Shumagin islands. Every move westward, however, increases the length of the voyage, which involves greater cost of production as well as a longer time from when the fish are caught until they can be marketed.

As halibut banks extend from off the coast of Oregon at intervals all the way to and into Bering sea, it might at first glance seem that the producing area is so large that exhaustion should not be probable, but it must not be overlooked that the continental shelf on the Pacific coast is quite narrow, so that the producing area is not nearly as great as would appear from its length.

While the fishery on this side of the Pacific is engaged in only from Canadian and United States ports, owing to the fact that it is largely carried on beyond territorial waters neither country alone could control it. At the same time it is highly in the interests of both countries that the fishery should be permanently maintained in a flourishing condition. Hence the question of finding an adequate method of dealing with the matter was one of those that was referred to the Canadian-American Fisheries Conference that was appointed in 1918 by the Governments of the two countries to consider a settlement of outstanding fishery questions between Canada and the United States. The confer-

ence, after taking evidence on the different sections of the coast, unanimously recommended that for the purposes of conservation and for the following other reasons there should be a close season for halibut fishing from the 16th of November in each year to the 15th of February following, both days inclusive, and that the two countries should arrange for a joint investigation into the life-history of the halibut:—

1. The weather conditions are then at their worst, and all or nearly all of the serious loss of life and vessels in this fishery has occurred during this time.
2. It is during this period that practically all the loss of fishing gear takes place, and such loss is then enormous. It is claimed that 50 per cent of the gear of every vessel is lost or has to be cut away during this time. When it is stated that the larger vessels "set" what is equal to 48 miles of line per day, and that hooks are fastened to these lines at intervals of about ten feet, what this loss of gear means in the aggregate will be realized.
3. Apart from the monetary loss involved in the destruction of gear, which in itself is exceedingly heavy, this widwinter fishery tends to drive the fish from the grounds. As the fish bite with avidity during the spawning season, it is reasonable to assume that when this gear is left in the water fish will become impaled on most of the hooks and will eventually die and decompose.
4. The evidence shows that 15 per cent of the annual catch is made during these three months, but in addition thereto it is estimated that 10 per cent of the total catch is taken and destroyed on this lost gear.
5. The fish caught at this time are in a very inferior condition from a food standpoint and should not be marketed. They are thin, their flesh is flabby, and they are known to the trade as "slabs."
6. Three months in the year are needed to properly overhaul and prepare the vessels, so that these three months would be used to advantage.

While there was little or no division of opinion as to the wisdom of the above course on either side of the line, as it became part of a proposed agreement for the settlement of several questions on which action was being delayed, Canada proposed in 1922 that the halibut question should be considered by itself. This was agreed to and resulted in the Treaty of the 2nd of March, 1923, for the protection of the Pacific halibut, which is the first treaty that was signed on behalf of Canada by a representative of the Canadian Government only. The treaty was ratified on October 21, 1924, and became effective on the first of the following month.

It provides,—

- (a) For the appointment of an International Commission of four members—two from each country—which commission is to exist as long as the treaty remains in force. The commission is to make a thorough investigation into the life history of the Pacific halibut and to report to the two Governments; and
- (b) For a close season for halibut in the North Pacific from November 16 in each year to February 15 following, both days inclusive. This close season is to remain effective at least three years, at the end of which time it may be modified by agreement between the two Governments on the recommendation of the International Commission.
- (c) The Treaty is to remain in force for five years and thereafter until two years after either party has given notice to the other of its wish to terminate it.

The personnel of the Commission are:—

*Canadian Members*,—W. A. Fould, Director of Fisheries; J. P. Babcock, Assistant to the Commissioner of Fisheries for British Columbia.

*United States Members*,—Henry O'Malley, Commissioner of Fisheries for the United States; Capt. Miller Freeman, Publisher of *Pacific Fisherman* and other periodicals (Seattle).

The commission held its inaugural meetings at Seattle and Vancouver in November, 1924. Keeping in view the magnitude and peculiar difficulties of the investigation with which it was entrusted it decided on the following methods of procedure:—

1. The employment of a competent man as Director of Investigations.
2. The appointment of an honorary scientific advisory council, with which not only the Commission but the Director of Investigations could consult, and to which would be submitted the plan of investigation proposed by the Director, and such expansions thereof as would from time to time be found feasible.

This council consists of two members from Canada and two from the United States, viz.:—

*From Canada*.—Dr. A. McLean Fraser, Professor of Zoology in the University of British Columbia, and formerly Director of the Marine Biological Station at Departure Bay, B.C.; Dr. W. A. Clemens, Present Director of the aforesaid Marine Biological Station.

*From the United States*,—Professor John N. Cobb, head of the Fisheries College of the University of Washington; N. B. Schofield, in charge Department of Commercial Fisheries of California, San Francisco.

As above indicated the only compensation the members of the Council expect or receive is the personal satisfaction of assisting in a work of great value to both countries.

As Director of Investigations Mr. W. F. Thompson, a graduate of Stanford University, and who at the time was Director of the California Fisheries Laboratory, was engaged. Mr. Thompson had already spent two seasons in investigating the life-history of the halibut—1914-1916—when he was employed by the Fisheries Department of British Columbia. He had proved himself to possess the qualifications for which the commission was seeking. He entered actively upon his duties early in the year 1925, and since that time the work of investigation has gone on continuously. He has now a staff of five assistants, and the commission expects that as contemplated by the Treaty the investigations will be sufficiently advanced to enable the Commission to submit a report to the two Governments at the end of the three year period provided as a minimum for the close season.

The work is being carried out on a statistical and biological basis. A thorough statistical survey since the beginning of the industry has been nearly completed, and will be finished during the coming year. Also good advancement has been made towards determining the migration, growth, racial characteristics, etc. of the halibut. This side of the work will be greatly developed during the approaching season.

#### MARINE BIOLOGICAL BOARD

The Biological Board, which operates under the control of the department, was created in 1912 by Act of Parliament. It carries on purely scientific researches at two stations, one located at St. Andrews, N.B., and the other at Nanaimo, B.C. For ten years the membership of the board consisted entirely

of scientists, two of which were nominated by the minister and the others by universities in which biological research was being carried on. In 1923 the Act was amended with a view to bringing the board into closer contact with the practical problems of the fishing industry. Under the amended Act the board now consists partly of scientific men and partly of men familiar with the industry's practical side. With this new organization there have been established on both coasts stations at which it is intended to apply to the every day economic problems of those engaged in the industry, the results of previous and current scientific researches.

The new Atlantic station is located at Halifax, N.S. It was made ready for occupancy in the summer of last year, and in that short time a considerable amount of work of much economic value to the fishing industry has been accomplished.

The new Pacific station is located at Prince Rupert, B.C. Work at this station has not yet advanced so far as at the Halifax one, owing to some difficulty that arose over a site which is being provided by the Provincial Government, in addition to about half of the cost of the building that is to be erected thereon. The matter has now been satisfactorily settled, however, and the work is proceeding. In the meantime facilities have been provided by some of the fishing companies of Prince Rupert for the carrying on of experimental work, particularly with regard to refrigeration.

In addition to conducting the ordinary work of the stations, the board, during the year, provided short scientific and practical courses for fishery officers and fish hatchery officers. It also, at the request of the department, instituted a systematic plan of investigation covering a period of years into present fish cultural methods, through the agency of a committee of the board, known as the Research Committee.

The composition of the board and its various committees during the year 1925 was as follows:—

Dr. A. P. Knight, Chairman, Kingston, Ont.  
 Mr. J. J. Cowie, Secretary-treasurer, Ottawa, Ont.  
 Dr. Philip Cox, University of New Brunswick, Fredericton, N.B.  
 Dr. C. J. Connolly, St. Francis Xavier College, Antigonish, N.S.  
 Dr. C. H. O'Donoghue, Manitoba University, Winnipeg, Man.  
 Dr. E. E. Prince, Ottawa, Ont.  
 Very Rev. Canon V. A. Huard, Quebec, P.Q.  
 Dr. A. H. Hutchinson, University of British Columbia, Vancouver, B.C.  
 Dr. J. Playfair McMurrich, University of Toronto, Toronto, Ont.  
 Dr. W. T. McClement, Queen's University, Kingston, Ont.  
 Dr. A. H. McKay, Halifax, N.S.  
 Dr. R. F. Ruttan, McGill University, Montreal, P.Q.  
 John Dybhavn, Prince Rupert, B.C.  
 A. Handfield Whitman, Halifax, N.S.

The members of the board receive no pay, but are allowed travelling expenses in connection with the board's work and its meetings.

*Executive Committee of the Board.*—Dr. A. P. Knight, Mr. J. J. Cowie, Very Rev. Canon Huard, Dr. J. P. McMurrich, Dr. E. E. Prince, Dr. R. F. Ruttan.

*Atlantic Sub-executive Committee.*—Mr. A. Handfield Whitman, chairman; Dr. A. H. McKay, Dr. C. J. Connolly, Dr. A. G. Huntsman as secretary.

*Pacific Sub-executive Committee.*—Mr. John Dybhavn, chairman; Dr. A. H. Hutchinson, Dr. C. H. O'Donoghue, Dr. W. A. Clemens as secretary.

*Research Committee.*—Dr. A. G. Huntsman, chairman; Dr. R. E. Foerster, secretary; Dr. W. A. Clemens, Dr. A. H. Leim, Dr. C. H. O'Donoghue, Dr. Philip Cox.

Director Atlantic Coast Stations, Dr. A. G. Huntsman.

Director Pacific Coast Stations, Dr. W. A. Clemens.

A detailed report of the activities of the board's staff of workers will be found at appendix No. 2 of this publication.

#### NATURAL HISTORY OBSERVATIONS

During the summer and fall of 1925, the department's naturalist carried on investigations, as follows:—

A study of the American oyster, chiefly in regard to the development of the sex elements within the gonad;

Tidal observations at Buctouche and vicinity in relation to where oysters can live in the winter, the food of the oyster and parasites which infested it;

Observations as to how oysters are locally distributed at certain parts of the strait of Northumberland;

Observations of the mussel and soft-shell clams;

Observations of the present condition of the scallop at Mahone bay;

Observations of the value of Jumbo lobsters as reproducers;

Observations of the spawning habits of smelt.

At appendix No. 3 of this report, the naturalist's observations on the value of the Jumbo lobster will be found given in full.

I regret to report that twenty-nine fishermen lost their lives during the year in pursuit of their calling—twenty on the Atlantic coast and nine on the Pacific coast.

I am, sir, your obedient servant,

A. JOHNSTON,

*Deputy Minister of Marine and Fisheries.*

## APPENDIX

## REPORTS OF INSPECTORS OF FISHERIES

REPORT OF WARD FISHER, CHIEF INSPECTOR OF THE PROVINCE  
OF NOVA SCOTIA, FOR 1925

The total landed catch for the year was 249,000,000 pounds, an increase of 28,000,000 pounds, as compared with the catch of 1924.

The total marketed value of all fish and fish products was \$10,213,687, or \$1,436,436 greater than 1924.

The above is evidence that the fisheries, generally, were operated with satisfactory results to both fishermen and dealers. The conditions were favourable from the opening of the season, the weather being mild, and the coast free from ice, consequently the inshore spring operations began about two weeks earlier than for some years.

While the mackerel catch of 11,799,000 pounds was the second largest since 1910, the fishermen profited little, as the American markets were flooded by the extraordinary large catches taken off the coast of that country. Similar conditions affected the fishery during the previous year, when the catch was nearly equal to that of the past season.

There was a very considerable increase in the catch of flounders and skate, which fish, previous to 1924, was largely waste. Markets, however, have been found in Great Britain, to which country the greater portion of the catches are shipped. Nearly 700,000 pounds of skate were landed, having a marketed value of \$23,380.

The catch of scallops was 12,404 barrels, an increase of nearly 5,000 barrels over the previous year. In the comparatively new area of the Bay of Fundy district the catch was 8,187 barrels, as compared with the catch of the old and well-known fishery of the Chester district, where the catch was only about one-half that taken in the Bay of Fundy region. The development of these new areas is the more evident when it is noted that there were only thirty-five licensed scallop fishermen operating, as against nearly 200 in the Chester district. Other areas of considerable extent are known to exist in the Bay of Fundy waters, and investigations have shown that many other places along the eastern coast have deposits of this valuable shellfish. The markets are being extended and an excellent price was received for the available supplies.

Among the more outstanding features of the year were:—

## SUCCESS OF THE LOBSTER FISHERY

As the catch for 1924 was the smallest on record, it was quite generally feared that the fishery was suffering a serious decline and that drastic action would have to be taken to safeguard the fishery.

Happily, however, the catch for 1925 showed a substantial increase over the previous year, being 170,698 cwts., as compared with 115,275 cwts. for 1924, an increase of 55,423 cwts. With few exceptions the increase was general throughout the district. Also, the prices received by the fishermen were higher than the previous year.

The following totals show the catch, and the marketed values, as compared with 1924.

	1925 Catch		1924 Catch	
	Cwts.	Value	Cwts.	Value
Inverness.....	11,156	168,928	8,675	116,134
Richmond.....	6,721	98,540	4,097	35,530
Cape Breton.....	10,875	162,444	10,295	139,782
Victoria.....	5,026	89,126	5,471	93,341
Halifax.....	5,176	92,728	3,112	65,344
Guysboro.....	11,650	184,527	7,272	103,152
Antigonish.....	7,664	134,673	6,413	93,935
Pictou.....	16,840	265,139	12,302	159,676
Colchester.....	638	9,557	680	8,950
Cumberland.....	7,952	121,076	7,104	94,707
Lunenburg.....	2,327	32,182	1,224	23,452
Queens.....	5,751	77,923	2,727	43,004
Shelburne.....	24,811	448,454	15,785	304,693
Yarmouth.....	39,977	836,152	23,591	458,860
Digby.....	11,941	265,514	5,658	135,335
Annapolis.....	1,043	23,500	695	21,552
Kings.....	150	4,500	174	6,960
	170,698	3,014,963	115,275	1,904,407

The increases, as noted above, are largely responsible for the substantial increases in the total marketed value of the fisheries as compared with that of 1924. The quantity shipped alive to the United States and Canadian points, continues to increase from year to year, and undoubtedly affects the quantity packed. Over 63,000 cwts. were shipped alive last year, which is nearly 20,000 cwts. greater than since 1921. From the western district alone about 25,000 cwts. were shipped to the United States by steamers from Yarmouth, and, in addition, over 12,000 cwts. were shipped by smacks. The total quantity used for canning in the western district was 35,000 cwts., or less than the quantity shipped alive.

#### THE COD AND HADDOCK FISHERIES

The cod and haddock fisheries are so closely related, particularly with respect to the fresh, smoked, and dried fish markets, that they may be considered under the one head. The past year was a most successful one, the total catch being the greatest for any season during the past five-year period. The catch was 173,195,600 pounds, cod being responsible for 140,823,800 pounds, and haddock 32,371,800 pounds.

The following totals will reveal certain developments with respect to the disposal of the catches that will be of interest:—

#### COD

	Catch	Fresh	Smoked	Dried
	cwt.	cwt.	cwt.	cwt.
1921.....	1,415,190	74,620	16,456	319,660
1922.....	1,560,271	61,691	21,201	372,699
1923.....	1,048,943	75,970	30,888	219,405
1924.....	1,129,801	116,907	28,435	220,263
1925.....	1,408,238	97,866	51,226	300,932

#### HADDOCK

	Catch	Fresh	Smoked	Dried
	cwt.	cwt.	cwt.	cwt.
1921.....	259,195	114,247	39,917	10,741
1922.....	298,593	112,931	49,281	15,109
1923.....	297,023	132,202	51,481	12,551
1924.....	320,804	144,915	45,386	19,052
1925.....	323,718	148,935	45,103	16,818

It will be noted that during the five-year period the quantity of cod, smoked, has increased more than three-fold, while the quantity of haddock, smoked, has remained nearly stationary. On the other hand, the quantity of haddock marketed in a fresh state, which include fresh fillets, has increased from 11,424,700 pounds to 15,123,300 pounds.

The increase in the fresh and smoked fish trade, which also includes herring and mackerel, has been coincident with the excellent advertising of our sea products, backed by a very great improvement in the quality of the goods marketed. The improvement is particularly noteworthy with respect to fresh and smoked fish. Improved transportation facilities have done much to extend the markets.

The response to the efforts of the dealers to expand the markets is evidenced by the fact that notwithstanding the large increase in the catches, the orders from Canadian and American markets have exceeded the supply during a considerable portion of the year.

The extent and value of the fresh and smoked fish trade may readily be seen by noting that about 1,000 carloads were forwarded from Mulgrave and Halifax alone. In addition, large quantities were shipped in less than carload lots, and over 7,000,000 pounds by express.

The possibilities for continued expansion are excellent.

#### THE SUCCESS OF THE LUNENBURG FLEET

The Lunenburg fleet of seventy-four vessels had the most successful season on record for the number of vessels engaged. The total catch was 264,725 quintals, an average per vessel of 3,577 quintals. The "high line" was the schooner *W. E. Knock*, Captain William Deal, with a catch of 6,418 quintals.

What the success of the fleet means is readily seen when it is noted that the average price per quintal was \$7.25, or a total of over \$2,000,000. Rarely, if ever, in the history of the fleet, have the rewards been as great as during the past year.

The year also witnessed the result of the revival of the interest awakened by the success of the operations of 1924, when the fleet of sixty-four vessels had a very profitable year. The revival is indicated by the increase of twelve new vessels, and the continued activity of the shipyards. Some twenty new schooners were launched from the yards of the south shore west of Halifax. About ten more were on the stocks at the end of the year, and sufficient orders were on hand to keep the yards busy during the whole of 1926. About seventy-five per cent of the twenty new vessels were constructed in Lunenburg county yards, these adding greatly to the prosperity of the county.

It should, however, be pointed out that the satisfactory and remunerative marketing of any increased catches will only be possible by improving the present curing and processing methods. This is necessary in order not only to hold the markets which the Lunenburg cure has had control over many years, but also to enter new markets and successfully compete with the product of other countries. Lunenburg is becoming alive to the necessity of this course, and the coming season will see the result of the interest manifested in this regard.

#### COLD STORAGE EXPANSION

With the expansion of the fresh and smoked fish trade, it became quite evident that the present storage and handling facilities are wholly inadequate to properly care for the products. Halifax, which is fast becoming the great centre of the industry has prime need of greater and improved facilities. Negotiations are now in progress for the establishment of a large and modern cold

storage plant, which will not only be of direct advantage to the Halifax trade, but will greatly assist the business of the whole coast.

The Maritime Fish Corporation intends constructing a plant on the Dartmouth side of Halifax harbour, in order that the demands of the fresh fish trade may be met more expeditiously and profitably than from the present plant at Canso.

### THE STEAM TRAWLER FLEET

To meet the demands of the fresh and smoked fish markets, particularly during the winter season, the steam trawler fleet of six steamers was increased to ten, by the addition of the *Viernoe* operating for the National Fish Company, and the *Lord Beaconsfield*, *Lord Shaftesbury* and *Lord Darling* for the Maritime Fish Corporation. The ten trawlers are of British or Canadian registry.

### PROBLEM OF THE SHORE FISHERMEN

It is quite apparent that the new conditions arising from the remarkable expansion of the fresh and smoked fish trade are changing the whole trend of the industry. It is evident that the isolated fisherman is not in a position to take advantage of the markets. Nor is he, along a large portion of the coast, in a position to take care of the catches. Without capital, and without equipment for drying or pickling, he is sadly handicapped while his more fortunate brothers at Lockeport, Liverpool, Yarmouth and other buying and curing centres, are disposing of their catches direct from the boat for cash without any of the labour of caring for and curing the catch.

Operating methods have been greatly changed. In the earlier days 80 per cent of the catches of cod, herring and mackerel were marketed in a dried or pickled condition by the fishermen, the process occupying a large share of their time. These methods have quite generally been superseded, owing to the rapidly growing demand for fresh fish with the result that fishermen along a considerable portion of the coast dispose of their catches fresh from the boats, traps, and nets, and usually at a price so low as to make the business unprofitable, except at points where the large buyers may be easily and inexpensively reached. To put it in a plain way, the reason so many of our fishermen have quit is that they have found it impossible to earn a comfortable living under the conditions that have obtained the past ten or more years.

The introduction of motor power, and other modern methods have outdistanced many of the fishermen scattered along the coast. In 1882 the number of small boats, row and sail, was 12,000, employing over 22,000 men. At present nearly 6,000 gasoline boats are employed, representing an investment of nearly one and a half million dollars. The total value of the 12,000 boats in 1882 was only \$328,000.

The row and sail boat is too laborious an equipment to suit present-day conditions. The fathers, hard-working, simple-living, were not affected by the love of easy living, quick return, and bright lights, all of which are essential to the children if they are to keep step with the enterprise of prosperous life.

The loss of man-power has been more than made up by the adoption of better equipment, better processing of the catches, larger rewards and quicker return. The cod catch, for instance, has increased from 61,000,000 pounds in 1882 to 113,000,000 pounds in 1924, and the catch of haddock doubled.

While the loss in our fishing population is to be deplored, the industry is in a much more promising condition than in its history, due largely to the creation of fresh fish centres. The demand for sea food is growing more insistent, and notwithstanding the growth in storage and processing establishments, and the introduction of a fleet of modern steam trawlers, the demand is difficult to meet, particularly during the winter season.

It would appear that the problem of the shore fishermen can be solved in two ways only. First, by the employment of the smaller deck boat of 10 tons or more, and of the larger schooner of from 40 to 70 tons, thus enabling the grounds to be fished for several successive days before returning home. Or, second, employment of many of the shore fishermen in connection with the larger centres, or with the schooner fleets. For instance, during the past year the Lunenburg fleet has had to engage about 400 fishermen from Newfoundland, in addition to the number previously employed, to make up the necessary quota to man the vessels. It is not easy for many of our fishermen to break old customs. For generations they have been their own masters, largely independent of outside influences, and therefore they do not take readily to employment either on the fishing fleets or on shore.

With particular regard to the necessity for larger boats and vessels, and improved methods, the following statistics covering the landings at Lockeport the past year will be of interest, as that port has built a fleet of small schooners and large motor boats able to operate the whole year:—

## LOCKEPORT 1925

	Cod	Haddock	Inshore	Offshore
	lb.	lb.	lb.	lb.
January.....	213,500	164,000	377,500	
February.....	278,000	241,500	456,500	63,000
March.....	304,000	111,000	134,800	280,500
April.....	221,000	141,500	35,500	327,000
May.....	312,000	41,800	353,800	
June.....	411,500	122,500	468,500	44,000
July.....	632,000	6,000	444,600	188,000
August.....	511,000	3,600	244,600	270,000
September.....	284,500	141,000	352,500	73,000
October.....	215,000	91,500	306,500	
November.....	515,000	471,500	563,500	423,000
December.....	183,000	121,500	304,500	
	4,080,500	1,652,000	4,042,800	1,668,500

The above shows that nearly five and three-quarter million pounds of cod and haddock were landed at Lockeport, over four million pounds from the inshore grounds. In addition to the total quantity shown, considerable catches by the larger vessels were landed at Halifax, Liverpool, and other ports.

## LOSS OF LIFE

The hazardous calling of the fishermen has been poignantly revealed by the loss of life the past year. "What Price Fish" has been distressingly brought to the families and friends of the eleven following men who were drowned while engaged in their calling:—

(1) Ernest Brown, Stoney island, Cape Sable island, lost March 11, while fishing from small boat in Barrington bay.

(2) Kenneth Brown, Stoney island, Cape Sable island, lost March 11 from small boat off Stoney island.

(3) Carl Neilson, washed overboard from the National Fish Company's trawler *Lemberg*, during a heavy gale while the trawler was on her way from the fishing bank to Halifax.

(4) Richard Schnare, East River, Lunenburg county, lost March 14, from the schooner *Mary H. Hirtle*, while fishing on Western Banks.

(5) Freeman Feener, Lunenburg, lost April 27, from schooner *Jean Smith*, while fishing on Western Banks.

- (6) William Newport, Garnish, Newfoundland, lost May 6, from schooner *Vera P. Thornhill*, while fishing on Quero Bank.
- (7) Charles Grundy, Garnish, Newfoundland, lost May 5, from schooner *Vera P. Thornhill*, while fishing on Quero Bank.
- (8) Belden Cox, south side, Cape Sable island, lost May 6, while fishing from dory off Spectacle island, Yarmouth county.
- (9) Bernard Cox, south side, Cape Sable island, lost May 6, while fishing from dory off Spectacle island, Yarmouth county.
- (10) Richard Hynick, Blue Rocks, Lunenburg, lost August 21, from schooner *Douglas J. Mosher*, while at Queensport harbour, Guysboro county.
- (11) John Cook, South Ingonish, Cape Breton, drowned December 8, when dory upset in heavy gale while attempting to reach the schooner *Julia F. C.*

#### FISHERIES CRUISER SERVICE

The past year the patrol was undoubtedly the most important of any reported for many years. The winter season was particularly difficult, hazardous and strenuous. Ice conditions and gales were unusually heavy. Both Captain Barkhouse of the *Arras*, and Captain Cousins of the *Arleux* deserve commendation for the zeal and vigilance which characterized their work. A digest of the logs will reveal the nature of the service, and show a record of outstanding efficiency.

#### CRUISER "ARRAS"—CAPTAIN BARKHOUSE

The *Arras* was placed in commission at Liverpool, N.S., on May 21, and was undergoing her annual refit.

June 9. Proceeded to sea, cruising on station arriving in Halifax for supplies on June 10.

June 18. Proceeded cruising on station between Halifax and Shelburne.

June 22. Returned to Halifax to prepare for cruise to Grand Banks off Newfoundland, to act as hospital ship with the Nova Scotia fishing fleet.

June 26. Proceeded to sea and located the fishing fleet on June 28. Ship remained with the Grand Banks fleet until July 4, when she proceeded to the Western Banks, Middle Ground, Quero and Sable Island fishing grounds.

July 9. Arrived in Newfoundland waters, and joined the Grand Bank fleet. The ship remained with the fleet, giving medical treatment to all sick fishermen.

July 24. Found the Lunenburg schooner *Delawand II* ashore off the entrance to Holyrood harbour. Succeeded in floating the schooner without any damage. Remained in close touch with the fleet until all left for home and Western Banks on August 30. Cruised west with the fleet, arriving at North Sydney, September 1.

During the fishing season on Grand Banks we had 115 cases of sickness and four hospital cases which were taken to St. John's and placed in hospital.

September 2. Proceeded to St. Pauls island to calibrate the Direction Finding Station.

September 3. Cruised west and took up our cruising station on the west coast of Nova Scotia.

September 26 and 27. Calibrated the Direction Finding Station at Yarmouth, then proceeded cruising on station from Halifax to Prince Edward Island. Remained on station until November 7.

November 8. Cruising west, found the schooner *Eldora* in a sinking condition in the Bras d'Or lakes. Placed crew on board to assist with pumps and took schooner in tow.

November 9. Left schooner *Eldora* at D'Escouse, Cape Breton, then cruised west, arriving at Halifax on November 10.

November 11. Took up station on the south coast of N.S., cruising between Halifax and Shelburne to assist vessels and keep the harbours free from ice. Continued on this station until March 31, 1926.

During the winter the *Arras* assisted fifty-three schooners and two steamers from ice, and kept the harbours open when needed for the safe movements of shipping.

During the year there were thirty-seven American fishing vessels on the stations on which the *Arras* was working; these we boarded fifty-three times.

There were very few complaints about illegal fishing by foreign fishing vessels, and not one complaint of interference by beam trawlers on the Grand Banks of Newfoundland.

During the year the *Arras* steamed 13,993 miles, being at sea 1,546 hours, and consumed 1,107 tons of coal.

#### CRUISER "ARLEUX"—CAPTAIN COUSINS

March 21. *Arleux* completed repairs and proceeded to Halifax for supplies.

March 27. Cruising westward towards Lunenburg, Liverpool, Lockeport and Shelburne on patrol work. Fishermen report taking good catches of lobsters along the coast.

March 31 to April 2. Continued cruising regular station. On that date proceeded in search of missing fishing schooner *Opitza* of Lockeport. At 6 p.m. received message that schooner arrived at home port.

April 23. Proceeded towards vicinity of wrecked steamer *Raifuka Maur* (Japanese) in search of bodies.

April 24. Searching for bodies in vicinity of wreck. At 3.30 p.m. spoke to H.M.S. *Wistaria*. Sea too rough to continue search. H.M.S. *Wistaria* proceeded towards Halifax, 8.30 p.m. Wind increased to strong N.E. gale. Proceeded towards Nova Scotia coast, arriving at Shelburne at 6.30 p.m., April 25.

May 2. Cruising eastward, 3.30 p.m. off Little Hope picked up wrecked Tern schooner *Cape Dor's* motor boat. Proceeded to Liverpool, delivered boat to Customs.

May 3. Proceeded to wrecked schooner *Cape Dor* and took wreck in tow out of way of navigation. After towing schooner two miles pulled rudder off vessel. Proceeded to Liverpool.

May 16. Proceeded to wreck and took her in tow to Liverpool bay.

May 8. Wrecked schooner was blown up by H.M.C.S. *Festubert*.

May 11. Cruising towards Halifax for supplies.

May 16. Cruising westward to meet American seining fleet due on Nova Scotia coast.

May 21. At Shelburne, boarded American seiner *Lucia*, first seiner to arrive on coast.

May 27. Cruising off Sambro with fifteen American seiners, no mackerel sighted.

May 30. Cruising east with seining fleet, several seiners taking mackerel off Liscomb, and bound home with catches. Local netters taking good catches of mackerel.

June 2. Cruising off Canso with seining fleet. No mackerel schooling.

June 5 to June 7. Cruising between Canso and Louisburg with seiners. Several seiners taking mackerel.

June 17. Last seiners left the coast. The larger body of mackerel seemed to have passed before the seiners arrived on coast.

June 18. Arrived at Halifax.

June 20 to 27. Performing work for Marine and Fisheries Department at Dartmouth.

July 8-14. At dockyard, Halifax, cleaning boiler, etc.

July 15. Cruising westward towards Lockeport and Shelburne to look after American fishing vessels taking bait inside three-mile limit.

July 31. 11.55 a.m. proceeded to Government wharf at Shelburne to assist fighting fire on wharf.

August 1 to August 3. Cruising between Liverpool and Shelburne. Herring plentiful. Large fleet of local fishing boats fishing between Liverpool and Shelburne.

August 4. Cruising towards Yarmouth, arriving there at 6.15 p.m.

August 7. Proceeded with scallop boat *Jessie May*, Fishery Overseers Torrie and D'Entremont on board, to Mud islands, locating position for scallop boat for dragging operations. Found no scallops.

August 8. Carried on dragging operation, but found no scallops. At 4.15 p.m. arrived at Pubnico.

August 10. Proceeded to Yarmouth, arriving at 11.25 a.m.

August 11. Scallop boat *Jessie May* at Yarmouth with engine trouble. Took up operations from the *Arleux* between S. W. Fairway buoy and Yarmouth cape. Overseers Torrie and D'Entremont and Mr. McRae of the scallop boat *Jessie May* were on board. Found no scallops.

August 12. Operating between Lurcher shoal and Brier island, where a large number of scallops of good quality were found. This bed has not yet been fished by fishermen.

August 18. Operating for scallops southwest of Brier island about 6 miles. Found large number of scallops.

August 19. Proceeded towards Shelburne to look after American fishing vessels.

August 21. Proceeded to operate for scallops off Shelburne and Lockeport. Found no scallops.

August 24. Cruising eastward, arriving at Halifax.

August 28. Proceeded cruising towards Canso and Northumberland straits.

August 31. Arrived at Pt. Du Chene.

Sept. 2. Looking after illegal lobster fishing off Richibucto, N.B. At 10.45 a.m. seized motor boat with illegal lobsters on board 2 miles north of line. Took motor boat in tow to Port DuChene and passed her over to Fishery Overseer LeBlanc at Shediac.

*Arleux* patrolling between Richibucto and Miramichi Bay, destroying a large number of lobster traps and gear. A great deal of illegal lobsters are smuggled in to factories operating in other districts where open season is on. This smuggling could be stopped to a great extent if a fast motor boat was attached to the *Arleux* while on this patrol, as the water on this coast is very shallow, and the ship is obliged to remain so far off shore. A great deal of the smuggling is carried on close in shore.

The *Arleux* remained in this district until September 30, when she returned to the western coast of Nova Scotia.

October 2. At Halifax.

October 7. Cruising westward to Grand Manan and Bay of Fundy, on patrol work. Fishermen report fairly good fishing along the coast.

October 20. Calibrated D. F. Station at St. John, N.B.

October 22. Arrived at Yarmouth.

October 23. Cruising eastward.

October 27. Arrived at Halifax.

November 3. Cruising westward in search of illegal fishing. Few mackerel taken off Lunenburg.

November 7. Three American seiners on coast, cruising in company with seiners as far as Sambro. No mackerel showing.

November 7 to 13. Seiners working between Sambro and Cross Island, Lunenburg.

November 19. Seiners left the coast with no catch.

November 20. Ship at Shelburne. Officers and crew attending services on board United States steamer *Tampa* in respect to the officers and seamen drowned from the United States steamer *Morrell* in Shelburne harbour November 16.

November 21. Towed in schooner *Athena* to Shelburne in a leaking condition, and docked schooner at wharf.

November 23. Proceeded eastward, arriving at Halifax, for cleaning boiler.

December 1. Cruising westward on patrol work as far as Yarmouth, looking after American fishing vessels.

December 12. Cruising eastward, arriving at Halifax December 14.

December 16. Cruising towards Canso to protect the winter fishing fleet.

December 17. Cruising in Chedabucto Bay with fishing fleet from Arichat, Petit de Grat and Canso.

December 19. Towed coasting schooners *Carl Richard* and *Speed* to Inhabitants Bay. 3.30 p.m. towed fishing schooner *Hockomock* with engine trouble, into Canso.

December 30. Towed coasting schooner *John Halifax* to Gut of Canso. Cruising with fishing fleet in Chedabucto Bay. At 6.15 p.m. proceeded in search of missing fishing boat from Dover. 8.00 p.m. received wireless message that boat had arrived safely at Canso.

December 31. Towed coasting schooner *J. E. Garland*, with damaged sails, from Canso to St. Peter's canal. Ship breaking ice in canal, and returned cruising with fishing fleet.

January 3. Proceeded westward towards Sheet harbour.

January 4. Breaking ice in Sheet harbour and assisting pulp steamer *Urter* through ice to West river.

January 6. Breaking ice in East river, and towing coasting schooner *Flora* clear of ice.

January 7. Cruising eastward towards Canso, arriving at Canso 5.15 p.m.

January 9. Breaking ice in Gut of Canso, and assisting ss. *Robert Cann*, and *S.S.C.D. 98* through ice to Mulgrave.

January 11. Towed coal laden schooner *Linda Pardy* from Port Malcolm to Guysboro, and proceeded to Canso.

The haddock season closed at Canso, and boats hauled up. The haddock fishing season was poor owing to fish being scarce and the weather during the month of December rough.

January 13. Cruising westward arriving at Goldboro.

January 14. Proceeded westward with ss. *Westport III*, in tow, arriving at Sheet harbour at 3.55 p.m. Breaking ice in Sheet harbour to release pulp steamer *Urter* frozen in at West River.

January 15. Breaking ice in Sheet harbour. Broke schooner *Cecial B* clear of ice, and moored schooner to Government wharf.

January 16. Breaking ice in Sheet harbour and West River.

January 17. 1 p.m. released pulp steamer *Urter* from ice. Steamer proceeded on her voyage.

January 18. Breaking ice in East river, and opening up navigation to steam boat wharf.

January 20. Proceeded westward with the ss. *Westport III* in tow, arriving at Halifax at 5.25 p.m.

January 25. Cruising towards Lunenburg. 2.15 p.m. breaking ice in Lunenburg harbour and releasing vessels.

January 27. Proceeded to pull off stranded schooner *Dorothy M. Smart* ashore on west side of harbour. Several attempts were made, parting hawser.

January 31. Succeeded in pulling off stranded vessel.

February 1. Moored ship at Railway wharf, Lunenburg. Ship laying up for refit.

#### FISHERIES PATROL SERVICE

##### MILDRED MCCOLL—CAPTAIN WILLIAMS

Patrol boat *Mildred McColl* was placed in commission April 30. She was engaged in patrolling the waters of Halifax and Guysboro counties during the months of May, June and July, preventing illegal lobster fishing and assisting the local overseers in the performance of various duties. In June and July, also again in November, she was called upon to render assistance in Lunenburg county—an adjoining district.

On August 3, she proceeded from Halifax to Pugwash, Cumberland county, to supervise lobster fishing in the Fall fishing district, Northumberland straits. En route, various patrol work was performed along the coast. Arriving at Pugwash, before the opening of the season, buoys were taken on boat and the line dividing the spring and fall seasons was marked off. The work done by the *Mildred McColl* in this district kept illegal fishing at a minimum. This fact is well recognized by those interested in the industry.

Daily patrols were made along the lobster fishing boundary line and amongst the fishing boats.

She also assisted in scallop dragging investigations in the vicinity of Wallace.

At the close of the season the boundary line buoys were landed and she proceeded on October 20 to Halifax to take up further work in Halifax county. She was laid up at the Dockyard, Halifax, on January 20.

##### PATROL BOAT "A"—CAPTAIN BAKER

Patrol boat "A" commenced the usual patrol on June 9. This boat gave very satisfactory service during the last year, and kept up a steady patrol along the shore between Pubnico and the head of the Bay of Fundy, and was of great assistance in keeping down illegal lobster fishing.

#### REPORT OF J. F. CALDER, DISTRICT No. 1, NEW BRUNSWICK, FOR THE YEAR 1925

This district comprises the counties of Charlotte, St. John, Albert, and the Bay of Fundy watershed of Westmorland county.

The following is a brief summary of the catches and the marketed values for the present year:—

		19,364 cwt.	Marketed value.	\$	39,627
Cod.....	16,539	"	"	"	29,532
Haddock.....	59,643	"	"	"	74,602
Hake.....	28,804	"	"	"	38,022
Pollock.....	131	"	"	"	1,829
Halibut.....	722	"	"	"	2,311
Flounders.....	215	"	"	"	587
Skate.....	10	"	"	"	10
Plaice.....	171,812	"	"	"	187,486
Herring.....	158,259	brl.	"	"	1,016,325
Sardines.....	17,800	cwt.	"	"	38,920
Alewives.....	3,150	"	"	"	56,627
Salmon.....	3,600	"	"	"	38,368
Shad.....	366	"	"	"	7,118
Smelts.....	11,507	brl.	"	"	62,812
Clams.....	201	cwt.	"	"	563
Cockles.....	5,701	"	"	"	195,153
Lobsters.....	1,091	"	"	"	5,008
Winkles.....	3,800	"	"	"	6,840
Dulse, green.....					

The total marketed value of the catch is \$1,854,792, against a valuation of \$2,022,373 for the catch of 1924.

## COD

There was a considerable falling-off in the catch of cod as compared with the previous year—19,364 cwts. were taken as compared with 29,124 cwts. for 1924. However, the catch of cod for the present year was well up to the average—the 1924 catch was exceptionally large.

## HADDOCK

Haddock were quite plentiful. The catch was 16,539 cwts., while 14,892 cwts. were taken during 1924. The haddock catch was the best for many years.

## HAKE

A very large catch of hake was made, the total yield being 59,643 cwts. as compared with 49,356 cwts. for the previous year.

## POLLOCK

There was a very satisfactory increase in the catch of pollock as compared with the previous year—28,804 cwts. were taken, while 8,391 cwts. only were taken during 1924. The catch for the present year was practically the same as the 1923 catch. This fishery was practically a failure during 1924, and it is reassuring to be able to report a satisfactory increase in the catch for the present year.

## HERRING

The catch of herring was 171,812 cwts. Most of these fish were smoked by the fishermen at Grand Manan. While these figures show a fairly large catch, the supplies in the weirs were practically unlimited. The catch represents the quantity that the fishermen were able to make use of. A very large pack of smoked herring was made at Grand Manan, and is being marketed at rather unsatisfactory prices. The market opened with the boxed herring selling at a price equivalent to  $3\frac{1}{4}$  cents per pound for the cured article; later the price dropped to  $2\frac{1}{4}$  cents per pound. It is to be regretted that there is not a larger market for our smoked herring. These fish are put up in the best possible manner, and ready market should be found for a large pack. However, whenever a large pack is made, the market becomes glutted, prices drop, and the fishermen generally get a less amount in the aggregate for a large pack than they do for a small one.

## SARDINES

One hundred and fifty-eight thousand two hundred and fifty-nine barrels of sardines only were sold, as compared with 269,643 barrels in 1924. These figures have no relative bearing as to the quantity of sardines that were sold in the weirs. There is no question but that there were more sardine herring in the weirs during the past year than in any other year in the history of the industry. Sardine herring were also exceptionally plentiful along the coast of the state of Maine. The state of Maine fishermen offered their catch at a less price than the export price on our side—\$10 per hoghead—and as a result of the same, sold their own packers a much larger portion of the supply than during any previous year. It must not be inferred from this that our weir fishermen were the actual losers by the "sale for export" price condition in the licenses, because if there had been no such restriction, it is not at all likely that the price would have been over \$2 per hoghead. Consequently, while our fishermen would have

sold a much greater quantity during the year if there had been no such condition in the licenses, at the same time they would have received less money than what they obtained from the quantity that was sold.

#### SALMON

There was a satisfactory increase in the salmon catch for the present year—3,150 cwts. being taken as compared with 2,750 cwts. for 1924.

#### CLAMS

Eleven thousand five hundred and seven barrels of clams were taken, as compared with 23,907 barrels for the previous year. The quantity of clams sold during the year is governed altogether by the demand for this fish. During 1924 the market for canned clams was good and the cannery, on both sides of the international boundary line, bought considerable quantities from our fishermen. This year the market was not very good, with the result that a limited amount only were bought.

#### SHAD

The spring run of shad was exceptionally good; 3,600 cwts. were taken by the fishermen at Lorneville and St. John Harbour. This is the largest catch that has been made for a great many years. The fishermen made good money during the short time they were employed at this branch.

#### ALEWIVES

There was a slight increase in the alewife catch as compared with the previous year—17,800 cwts. were taken, as compared with 15,000 cwts. for 1924.

#### LOBSTERS

There was a slight falling off in the lobster catch; 5,701 cwts. were taken, against 6,022 cwts. for the previous year. The price, however, was better than that for 1924 and \$195,153 was realized as compared with \$173,969 for the previous year.

### REPORT OF INSPECTOR A. L. BARRY, DISTRICT No. 2, NEW BRUNSWICK, FOR 1925

This district covers that part of New Brunswick bordering on the bay Chaleur, gulf of St. Lawrence, and Northumberland strait, and including the counties of Restigouche, Gloucester, Northumberland, Kent, and the strait side of Westmorland county.

The total marketed value of the fisheries for 1925 was \$2,909,562, as compared with \$3,327,738 for the previous year, a decrease of \$418,176. The following table shows the comparison of this year's fishing to the previous year:—

		1925		1924	
		Quantity	Value	Quantity	Value
			\$		\$
Cod.....	cwt.	186,180	472,386	230,042	571,416
Herring.....	"	200,898	197,868	217,054	200,528
Mackerel.....	"	16,707	63,968	13,845	49,166
Alewives.....	"	16,395	24,323	5,630	6,881
Bass.....	"	477	6,820	868	11,520
Salmon.....	"	26,377	231,825	30,317	363,583
Smelts.....	"	46,326	711,031	63,748	841,414
Lobsters.....	"	60,193	874,569	62,281	1,029,595
Haddock.....	"	1,647	3,014	1,746	3,798
Hake and cusk.....	"	7,249	12,544	7,622	14,816
Trout.....	"	161	2,266	179	2,360
Eels.....	"	406	2,750	221	2,050
Tom cods.....	"	13,056	41,517	13,375	50,209
Clams and quahaugs.....	brl.	7,989	25,614	9,537	40,678
Oysters.....	"	12,038	88,693	17,201	103,040
Shad.....	cwt.	2,222	14,284	3,704	35,797
Flounders.....	"	231	704	28	42
Perch.....	"	146	876	22	64
Scallops.....	"	11	88		
Mixed fish.....	"	45	45	94	94

## COD

There was a decrease of 43,862 cwts. in the catch and a corresponding decrease in value. Cod were very plentiful in bay Chaleur but owing to the rough weather of July and September full advantage could not be taken of the large run. The price has held up right through the year, the fishermen receiving as high as \$8 per quintal and with the demand good.

## HERRING

There was a decrease both in the catch and value of herring. The spring run was a little late, which made it inconvenient for the lobster fishermen who were in need of bait, but on the whole, they were very plentiful around our shores and had the weather proved favourable a much larger catch could have been taken.

## MACKEREL

This shows an increase both in catch and value. More boats were fished than during the previous year.

## ALEWIVES

The catch of alewives was more than double that of the previous year with a large proportionate increase in value. There was a good demand all through the fishing season.

## BASS

It is to be regretted that the bass fishing is losing its importance in this district. In the Miramichi river the catch has fallen away to practically nothing. The fishermen lay the blame to the smelt nets, over two thousand of which are set in the Miramichi river and bay alone. Although most of the fishermen obey the regulations and throw the small bass back into the water, in real cold weather, they do not revive once the frost strikes them.

## SALMON

There was a slight decrease in the catch of salmon, but the price held up well throughout the year and they were always in good demand. The net fishing along bay Chaleur was very good during the early part of the year but the drifters off the Miramichi had a very lean year. Great destruction was also caused by the seals, one drifter having reported fifty salmon heads in his net after one night's fishing. The shipment of frozen salmon overseas always insures the fishermen a ready market for their catch.

## SMELTS

The smelt catch for 1925 was about two-thirds of the catch for 1924. The December catch for 1925 was real good and the decrease of the year is accounted for by the failure of the January and February catch for the 1924-25 smelt season. There was a decrease in the number of fishermen this year, owing probably to the fact that so many had lost money the year before. The introduction of the box-net at Cocagne and Buctouche has improved the fishing by doing away with a large number of spearing shanties which were operated by spearmen who were too poor to provide themselves with a bag-net. These shanties were operated on the ground that was very favourable for the use of the box-net and as a result many of the former spearmen have provided themselves with this excellent equipment and are doing well.

## SMELT GILL-NET FISHING

Considerable opposition is developing among the fishermen to the use of the gill-net before the opening of the bag-net season. Gill-nets were blamed for the scarcity of the smelts at Richibucto and Shediac. The fishermen believe that they scare the smelts off the fishing grounds. It is a well-known fact that seals and gulls have a daily feast out of these nets and as the fish thus taken are generally large, the cream of the catch is destroyed. The fishermen at Buctouche voted almost to a man to do away with the gill-net fishing and their request was granted. It is expected the same thing will occur at Richibucto next fall and it is hoped to soon do away with the early gill-net fishing in the entire district.

## LOBSTERS

The catch was slightly under the previous year, as well as the value. The catch differed greatly in different parts of the district. The spring fishing which is done in the northern part was very successful, whereas the fishing in the southern part of the district which does not begin until the middle of August was somewhat of a failure. The number of lobster packing canneries decreased from 143 to 138, but each year shows a great improvement in the canneries, three new steam boilers and four retorts being reported in the district of one overseer alone. The prevention of illegal fishing and packing of lobsters is still a great problem which we have to contend with in certain parts of this district, and the blame must rest with certain dealers who continue to buy illegal catch and pack. Until they make up their minds to stop this illegal traffic they need not complain about the scarcity of the lobsters.

## HADDOCK

There was a considerable decrease in the catch and value of haddock. This, however, is not one of the important fisheries of this district.

## HAKE AND CUSK

About the same as last year as to catch and value.

## EELS

Quite an increase was made in the catch of eels, mostly from the Big Tracadie river. They were reported scarcer on Eel river and the reason is laid to the fact that the cranes and herons are destroying the smaller ones.

## SHAD

There was a decrease in the catch of shad.

## TOM CODS

About the same quantity of tom cods were taken and the value is less than that of 1924. The introduction of the box-net at Cocagne and Buctouche has led to the working up of quite a tom-cod industry there, where formerly there was none.

## TROUT

The catch of trout was about the same as the year before.

## CLAMS AND QUAHAUGS

The lack of a ready market for these shell fish caused a falling off in both the catch and value. A start was made in canning the latter in the southern part of the district. The fish seem to be quite plentiful but the fishermen could hardly make a day's wage at the price offered.

## OYSTERS

The catch of oysters also fell off with a proportionate decrease in value. Buctouche and Malpeque oysters still find a ready market but their high standard is being destroyed by oysters being shipped indiscriminately as these brands. It would seem that some provision for standard barrels with the name of the shipper on the outside would be an improvement toward the betterment of this industry. There is no lack of fish and all it needs to make a good financial return to the fishermen is the proper grading of the oysters before shipment.

## SCALLOPS

No great steps have yet been taken to develop this fishery, the beds of which are without doubt very extensive in bay Chaleur. One fisherman has intimated that he intends to operate on a large scale during the coming year and it is hoped that if the fishery turns out as he expects others will follow.

With the exception of poaching for lobsters and salmon on the Miramichi rivers the fishery regulations have been pretty well adhered to. Prosecutions dropped from 42 in 1924 to 17 in 1925. A number of stiff fines for illegal salmon traffic on the Miramichi is expected to have the desired effect toward the protection of the salmon going up to spawn. The prosecutions for the year were as follows:—

Illegal fishing, 9. Having illegally caught fish in possession, 3. Fishing with illegal mesh, 2. Neglect to remove pickets from river, 1. Interference with a fishery guardian, 1. Bringing berried lobsters ashore, 1.

Confiscations, however, arose from 97 in 1924 to 111 in 1925. This increase is accounted for by the increased activity of the guardians in clearing out the illegal salmon rigging in the Miramichi rivers.

There was a great demand among the fishermen of the southern lobster district for an early opening of the lobster fishing season. This being refused by the department they proceeded to take the law into their own hands, and as a result much rigging was set out and a large number of lobsters taken. The prompt work on the part of the officers who seized nearly all of the first catch (about five tons) when they were laying in floats to be taken up, put a stop to any further activities until the opening of the season. Seizure of much lobster gear was also made when the fishermen persisted in setting out after the close of the fishing season in the northern district.

About twenty new boats were added to the vessels already in operation, although considerable damage was done during the storm of June last, and it is regretted that in bay Chaleur one boat was lost with all hands, numbering four, aboard.

I am pleased to report that the owners of the saw mills are taking the necessary steps to keep the refuse from getting into the streams. No wilful negligence has been reported and all seem to take kindly to the suggestions of keeping the streams unpolluted.

The fishways are all in fairly good working order, with the possible exception of the one at Kouchibouguac, which was promised attention by the directors last fall.

Last July, for the first, an attempt was made to destroy the seals which prowl about the mouth of the Miramichi river causing great destruction to the salmon and salmon nets. A Lewis gun, a couple of rifles and a considerable amount of ammunition was received from the Department of National Defence and with the aid of an ex-service Lewis gunner considerable destruction was caused to the groups of seals sunning themselves on the beaches in low water. The results were soon observed in the scattering of these groups. In all about 5,000 rounds of ammunition were expended. It is hoped, that during the coming year, the work will again be taken up only at a much earlier date so as to meet the large flocks of seals when they are first coming up the bay. This destruction must not be allowed to cease as the seals are getting more plentiful and bolder each year. What were once valuable fishing stands down the bay are now useless as the fishermen cannot afford the destruction of their nets.

#### REPORT OF INSPECTOR H. E. HARRISON, DISTRICT NO. 3, NEW BRUNSWICK, FOR 1925

District No. 3 comprises the counties of Kings, Queens, Sunbury, York, Carleton, Victoria and Madawaska.

Practically all fishing in this district is carried on during the open water months, consequently, the quantity of fish taken through the ice is not of much account, usually. The larger waters in this district shed their coats of ice rather earlier than usual. The St. John river opened about the first of April, and a steam boat reached Fredericton from St. John the 5th of that month. The weather during that month was cloudy and rather cold, and the spring freshet reached its highest point the first week in May, and the surplus water had run off by the last week of May, but heavy rains in July brought it back again to a considerable height.

The first fresh fish seen in the Fredericton market was on the 4th of April, which were alewives taken in the Oromocto river, near Fredericton. A few shad

were taken in the lower St. John river by the 15th of May, and there was a fair run of salmon by the 24th of May. Shad do not ascend the Southwest Miramichi river above tide water; alewives do not reach the water of my district until about the first of May, and salmon and sea trout little before the 20th of May.

The quantity and value of alewives taken was a little better than in 1924. The local demand for this fish was better than for some years previous, but, because of the absence of a market of any value during recent years the fishermen had allowed their nets to deteriorate, and they were not in a position to supply a very large quantity, as most of them have been catching only about enough to supply their own homes with fresh, smoked and salted alewives. Alewives were reported as being very plentiful in the lower waters of the St. John river and tributaries; a fair run in the central waters, and a very large run in the Southwest Miramichi river.

The bass fishery was of no importance in 1925. Just at the close of the year there is evidence that this fish made its appearance in fairly large numbers in the Belleisle bay district, and it is probable that the catch of 1926 will show better results, judging by the number of licenses issued after the 1925 season was about over. It is twelve years since a respectable catch of bass was made in the St. John river waters, and that length of time, or longer, since a previous good catch was made. Why these periodical fairly good runs I cannot say.

There was a slight decrease in the quantity of eels taken, with a comparatively large increase in value. If the fishermen could always obtain the price that they did for eels in 1925, it is probable that they would prosecute the fishery vigorously, to the advantage of themselves and the shad and salmon fishermen, as eels destroy many netted shad and salmon. The St. John river waters appear to be polluted with eels.

This fishery for mullets was prosecuted vigorously during 1925, and the increase in both quantity and value was proportionately good. This fishery has developed during recent years, and I trust that it may continue. The catch is shipped to the United States markets, as there is very little use for this fish, in my district, other than to feed to the farmers' hogs.

There was a shrinkage of about 50 per cent in the quantity and value of pickerel taken and sold during the year. The only reason given me for this is that the fishery was not prosecuted as steadily as during 1924 because of less demand for pickerel. It may be that certain consumers' tastes turned from this fish to mullets. Because of the comparative inactivity in the pickerel fishery during 1925 it ought to be better when again taken up, as the fish will have a chance to grow and to multiply.

It is very gratifying to me to be able to report another fair increase in the quantity of salmon taken this year. While the increase is not so great as that of 1924 over 1923, it is considerable, and, it seems to me, is fair evidence that we are receiving considerable benefit from the hatcheries that are making it possible to place large numbers of young salmon in the different waters, and, possibly, evidence of fairly efficient protection for the growing and grown fish on their ascent to the upper waters to reproduce. At times we are told that the fishery officers and guardians do not do their duty, and that salmon are illegally killed in large numbers. Such reports come usually from persons who have not had unusually good success in salmon angling, and because of that condition it is assumed that some persons have recently cleaned out the waters with a net or a spear. No fishery officer would, or should, be so foolish as to suggest that some salmon, possibly a considerable number in some instances, are not killed illegally, but, considering the number of men employed and the great area of waters to be protected, it is a wonder that many more salmon are not taken by other than legal methods. While it is true that there was a considerable increase in the number of licenses and permits issued in 1925, no doubt encouraged by the fairly

successful season of 1924, and the fact that it costs only three cents and a sheet of paper and an envelope to secure a license or permit, if the applicant is entitled to such, several persons secure a license or permit, and if they do not wish to use it, or, if after trying their luck for a short time they do not have any success, the operation is discontinued and the fishery is not damaged. I am advised by my officers that such is the case in many instances, and that the larger issue of licenses and permits is not evidence that excessive salmon fishing is carried on. The increase is fully accounted for in the two more important sub-districts—Kings and York counties,—so far as the increased catch is concerned, while the increase in the number of licenses and permits issued was in the counties of Kings, York and Carleton, with some decrease in the counties of Queens, Sunbury and Victoria. It is interesting to note that the average weight of salmon taken was considerably better than that of recent years. A large percentage were from ten to twenty pounds per fish; a considerable number from twenty to twenty-five pounds and some from twenty-five to thirty-two pounds, which to a large extent accounts for the increased total weight. Fishermen complained of the unfavourable season, while the fishery was in operation, but it appears to have been fairly successful, and was good enough, considering the fact that it is the duty of the department's officers to see that a fair percentage of fish reach the breeding waters, and it appears to me that this is being accomplished. I should like to repeat what I have stated on previous occasions that I think it would be the part of wisdom to require that the meshes of salmon nets be not less than 6-inch extension when in the water, as I feel that it would allow more of the small fish to escape the nets for another year, or longer, and eventually benefit the fishermen, and there would be less complaint from the salmon anglers about salmon taken by them being "net-marked."

The catch of shad in 1925 indicates one of two things, either that fishery is in a very healthy state at present, or the nets and weirs in St. John harbour were not able to get a fair proportion, but I understand that the harbour fishermen did have a very large catch, consequently, it would appear that the fishery is in good condition. I am sure that all hope it may continue so. The catch in 1924 was nearly 100 per cent greater than that of 1923, and the 1925 catch was more than 25 per cent more than that of 1924, while the respective issue of licenses for the years 1923-24 and 1925 was 219, 221, and 230. The districts where notable increases were made are the extreme south and north of the St. John river waters, viz., the Kennebecasis river and the St. John river at the Grand falls. In the former area the increase over 1924 was more than 100 per cent, and in the latter area it was more than 250 per cent, while in the central area, viz., Queens, Sunbury and York counties (Carleton county has not any shad fishery), the catch was a fraction less than during 1924. Shad appeared in the lower St. John river waters the first week in May, ten days to two weeks earlier than usual, and the quantity taken during the season was such that Overseer Bell reported that the fishermen ceased operations before the season ended or the run was over, as the market seemed to be glutted with fish, and, when the water gets low and warm, eels become very troublesome, and, fishing as they do in these waters with stationary nets, a great many shad are destroyed before the fish can be removed from the nets. A somewhat like condition, so far as a market for shad was concerned, prevailed in Overseer Robertson's district, notwithstanding only four nets were operated, and the season there was very short—it was June before the fish reached the Falls and the season was very late—the catch was proportionately large and the fishermen found it difficult to dispose of a portion of their catches.

It is possible that some of the shad taken at the falls had spawned before they were taken, and quite probable that all were quite soft after having travelled so far from the sea to spawn, so that they would not be as firm and

fine flavoured as when taken from the lower river waters, and particularly from the cold salt water of the harbour.

The sturgeon fishery shows a still further decrease; more than 30 per cent less than in 1924 and 50 per cent less than in 1923. More nets have been operated during the past three years than in many former years, and it may be that production is not able to keep up with destruction. There is a great number of small sturgeon in these waters, fish running from 18 inches to 3 feet long, but they appear to grow very slowly, and these are considered of no value, even if it were legal to kill them. The quantity of eggs, or caviar, taken was very little, and the fishermen said they were not offered any price for it, consequently none was sold.

The total weight and value of the commercial fishery of this district during the years 1924 and 1925 are as follows:—

Year	Cwt.	Value.
1924.....	3,716	\$33,698
1925.....	3,975	34,235

an increase of 259 cwt. and \$537 for the year 1925.

#### FISHING MATERIAL USED

Year	Value.
1924.....	\$15,676
1925.....	14,425

The total weight and value of the domestic fisheries for the same periods is as follows:—

#### DOMESTIC FISHERIES

Year	Cwt.	Value.
1924.....	473	\$8,845
1925.....	454	8,780

a slight decrease in both weight and value in 1925.

It appears from the reports of the local officers that trout were not so plentiful, in some districts at least, as they were the previous year. While this may be correct, it is not to be accepted as proof positive that trout were as scarce as the contents of the fish basket might indicate. Trout anglers reported to me that fish seemed to be scarce, while at the same time they complained of weather and water conditions. The weather was cold and the waters were unsteady in levels, therefore, it is quite possible that trout were not easily tempted with either bait or artificial fly. If the latter should prove to have been the trouble it was a good thing for trout, and should be better for the anglers this year, should conditions be favourable for angling. It appears to me that there is not as much trout fishing after the month of June, in some districts at least, as in former years. The reason for this is that some new salmon pools have been found, or some salmon have been taken on certain waters, and in such districts the little trout is left alone after the end of June and the salmon angling fever takes hold. This also is a good thing for the trout, as the salmon is pretty well able to take care of himself, so far as rod and line fishing is concerned. The St. John river itself does not furnish any trout fishing, neither sea nor speckled trout, but there are many tributaries, particularly of the Upper St. John river, where very good speckled trout fishing may be enjoyed.

Salmon angling on the St. John river, on those parts where this sport is followed up, was very fair in some districts and indifferent in others. It is sometimes difficult to account for such—the anglers usually account for it by

stating, and spreading it broadcast, that the fishery officers are not doing their duty and that salmon are allowed to be slaughtered with net and spear—but it is well known that salmon will not take a fly or artificial lure nearly as well under some conditions as he will under others, or, take two pools with an equal number of salmon resting in each and one may produce fair or good angling and the other may not produce any on certain days, while the reverse may be the case on another day. While salmon angling was not good at a certain pool near Fredericton in 1925 it was excellent in 1923, but it was not good on pools farther up the St. John in 1923, but it was very good in 1925, and the fish that were taken on the pools farther up the river had to pass through the pool near Fredericton, therefore, it is mostly a matter of weather and water conditions when the fish are resting, or passing through the pools, it seems to me. Conditions were very similar in the Tobique and Miramichi rivers districts, but in the latter part of the season angling was very good on part of my water of the latter river, but the fish did not reach the upper waters before the season closed, but large numbers went up late in the fall, as the water was very high. The members of the Tobique Salmon Club rather feel that they do not get a fair portion of the salmon that ascend the St. John river, and the Tobique river to spawn. I do not know how to remedy this condition, unless it be to practically stop all salmon netting between Fredericton and the mouth of the Tobique river. If we had more assistance in the way of guardians it might be that we could save a few salmon from illegal killing, but I think that aspect is not serious during recent years. The number of salmon killed by the members of the club referred to is not large, but, I understand that this club does practically all of their angling in the months of June and July, with none, or very little in August, and their camps are closed August 15 every year, therefore, it will be observed that their season is short, whereas other anglers carry on until the last of August and the 15th of September, and some to the last of September to their discredit, as there are not any clean and bright salmon in the rivers at that time. I should like very much if the salmon angling season were to end not later than the 15th of September, and it might be better if it were to end the last of August, and I should like to see all netting for salmon end the 15th of August in each year. It seems to me that both net fishermen and anglers ought to be satisfied with a reasonable period of fishing.

#### FISHWAYS

The fishways on the different rivers and streams are in good condition, but several of them are of minor value. Most of them have been built to assist salmon in reaching the upper waters of certain streams, but these streams are not what they were in olden times, and very few salmon try to ascend these waters now. Some were built to assist trout in passing obstructions, but I have yet to learn that they are of any benefit in that respect. Some concrete work was done at the lower end of the fishway (also of concrete) on the Nashwaak river at Marysville last season, and it is hoped that all of this work is of a permanent nature, so far as it is possible to make it. A run of salmon in the fall—apparently the only time they ascend the Nashwaak river—now has no difficulty in passing the dam. The dam at Forest City, York county, was rebuilt last season and the fishway was also rebuilt by the owners of the dam—"Eastern Pulpwood Company"—and it is believed that there is now a very efficient fishway at that place, at least it is pronounced so by an officer of the New Brunswick Government, Department of Lands and Mines. This fishway is said to be required to allow the landlocked salmon of Grand lake to descend to the waters below the dam to spawn, and later return to the lake, which is large, and where the fish remain during the rest of the year.

## PROSECUTIONS

Prosecutions during the year numbered nineteen, of which seven were for water pollution and the balance for illegal fishing, two of which, one for pollution and one for illegal fishing, were dismissed by the magistrates. Fines of \$400 were imposed of which \$275 was paid to the Receiver General of Canada; \$15 to the Tobique Salmon Club as complainant and prosecutor; \$90 in suspended sentences, and one fine of \$20 still unpaid.

## CONFISCATIONS

There were twenty-six confiscations of materials of an approximate value, placed at a low value, of \$95, \$68 of which has been collected in sales, with a small amount of the materials still to dispose of, when possible, and materials, such as spears, torches, torn nets, etc., to the approximate value of \$35 destroyed.

# REPORT OF S. T. GALLANT, INSPECTOR OF FISHERIES, PROVINCE OF PRINCE EDWARD ISLAND AND MAGDALEN ISLANDS, FOR 1925.

## PRINCE EDWARD ISLAND

The total marketed value of the fisheries for the province of Prince Edward Island for the year 1925 was \$1,598,119, an increase over that of 1924 of \$396,347.

The following table is interesting as showing the comparison between the catch and its marketed value for 1925 and that of the preceding year:—

Kinds of Fish	1924		1925	
	Quantity caught	Marketed value	Quantity caught	Marketed value
		\$		\$
Cod.....	41,036 cwt.	81,885	61,483	150,135
Haddock.....	418	554	968	1,652
Hake and cusk.....	15,430	27,081	14,939	22,981
Herring.....	37,716	58,684	64,942	83,703
Mackerel.....	7,640	37,448	6,220	23,246
Perch.....	6	6		
Halibut.....			21	210
Alwives.....	300 brl.	600	84	225
Salmon.....	62 cwt.	1,550	90	1,800
Smelts.....	14,273	133,747	17,595	142,496
Trout.....	91	1,092	107	1,328
Albacore.....			975	4,875
Caplin.....	90 brl.	270	138	552
Eels.....	785 cwt.	7,835	320	3,311
Tom cod.....	1,295	2,911	2,555	6,336
Clams and quahaugs.....	797 brl.	4,973	1,560	9,758
Oysters.....	7,945	63,840	5,278	52,780
Tongues and sounds.....	63 cwt.	1,458	48	960
Cod liver oil, medicinal.....	gal.		25	50
Cod oil.....	2,050	557	7,030	2,109
Fish oil, other than cod oil.....			1,800	900
Lobsters.....	65,893 cwt.	777,301	78,570	1,088,712

Codfish were plentiful early in May, which is unusual for this part of the coast, but as practically all the fishermen were engaged in lobster fishing, this fishery could not be taken advantage of until the month of June. Fishing was then carried on very successfully, and there was an increased catch and an increase in the marketed value.

## HADDOCK

There was an increase both in the catch and in the marketed value.

## HAKE AND CUSK

There was a decrease both in the catch and in the marketed value.

## HERRING

Fishing opened early in the season and lobster packers succeeded in securing a plentiful supply of bait. There was an increase in the catch and in the marketed value.

## MACKEREL

Mackerel were scarce and fishing was not carried on as extensively as in other years. Prices were poor, and there was a decrease in the catch and in the marketed value as well.

## SALMON

This fishery was carried on only at St. Peters, and there was a marked increase in the catch. I am anticipating a further development of this fishery in Richmond bay and Alberton bay.

## SMELTS

The season opened for gill-net fishing on October 15, and good catches of smelts were made until December 1, when the ice began to make on the rivers and interfered with fishing.

The bag-net fishing season opened on December 1, and in some localities some of the largest catches in the history of the province were taken.

There was an increase in the catch and also an increase in the marketed value.

## LOBSTERS

In 1924, to unfavourable weather conditions, which continued during the month of May, was attributed the reason for such a small catch, but in 1925, with favourable weather conditions from the outset, a large catch was expected; yet, as you will see from the above table, the increase was not very great. My honest opinion is that the supply of lobsters is gradually on the decrease, and I attributed said decrease to the fact that the work since the war has been scarce and lobster fishing, as a means of livelihood has been prosecuted to a much greater extent than in former years. It would, therefore, seem as if over-fishing is the cause of the gradual decrease that has taken place in the last two seasons.

It has also been noticed that on certain parts of the coast a very large quantity of lobsters from four to six inches in length are being packed; if this practice is pursued it can produce only one effect, viz., a decrease in the catch from year to year, as there will be very few lobsters left to mature. There was a large increase in the catch of jumbo lobsters, but I may say that it has only been during the last two or three years that these large fish were taken in any quantities. What effect this will have on the future of this our best fishery is difficult to foreshadow.

I believe steps should be taken at once to make "size limit" one of the regulations. I do not think there would be any great objection on the part of the fishermen or packers if a six-inch limit were established as a beginning; if

this were done, an increased catch would result in the course of a few years, and I am of the opinion that the fishermen would then ask for a size limit of seven or eight inches. Good results are sure to follow if a size limit be adopted.

## OYSTERS

There was a decrease in the catch and in the marketed value as well. Although there was a decrease in the quantity taken, this does not mean that the supply is being exhausted but may be attributed to the fact that the buyers have taken special care in selecting oysters that would meet the demands of the markets, and as a result, Prince Edward Island oysters were in demand up to the end of the season and good prices were realized, both shippers and fishermen being well paid for their efforts.

Never in the history of the province were East river and tributaries, West river and tributaries, Seal river and Vernon river so well stocked with small oysters. Special mention might be made of an oyster area at Cranberry wharf, East river, which was cleaned in the summer of 1924, and which is now literally covered with oysters of this summer's set. The cleaning of this area was largely an experiment, but it has proved a great success.

In Richmond bay, one man was successful in securing four barrels of good-sized oysters at a place called Bideford river, a tributary of Richmond bay. Some oysters are to be found also at the heads of the tributaries; it would appear from this fact that the spring freshet cleans the upper part of the rivers, giving the spat a chance to set, but it is different in the bay proper, which in years gone by was highly productive, and on these areas no live oysters are to be found.

A man, who has kept in close touch with the oyster fishery in Richmond bay for the past twenty-five years, writes as follows: "Personally I do not believe that the oyster beds will ever be productive until they are cleaned. There is now in Bideford river a sufficient quantity of oysters to seed all the oyster areas if the beds were cleaned to allow the spat to set."

Cleaning should be done in the month of June, as oysters extrude their eggs in the month of July.

## FISHERIES PROTECTION SERVICE

The usual attempts at illegal lobster fishing were made and we were forced to employ two additional patrol boats.

The total number of confiscations for various violations of the fishery regulations during the year were 34.

The total number of prosecutions were 9.

The following seizures of lobster gear were made:—

Year.	Rope. (fathoms)	Traps.	Anchors.
1925.	13,998	2,798	40

PROTECTIVE SERVICE BY PATROL BOATS "RICHMOND," "DAISY," "UPPERHAND," ETC.

The patrol *Richmond* was in charge of Captain Baglole and Assistant Fred McKinnon; patrol *Daisy* in charge of Captain Costain, and the patrol *Upperhand* in charge of Captain Henry Doyle. The captains and their assistants were most zealous in the discharge of their duties and did all in their power to suppress illegal fishing.

REMARKS

During the summer fishways were built at Laird's milldam, at the head of Morell river; in Campbell's milldam, at head of New Glasgow river; at Dixon's milldam at DeSable; and in the milldam at the head of Vernon river. This will permit the fish to ascend the head of the streams to spawn, and it is expected that these fishways will increase inland fishing in the streams above mentioned. Should they prove as successful as is anticipated, many of these fishways will have to be built in different parts of the province.

MAGDALEN ISLANDS

The total marketed value of the fisheries of the Magdalen islands for the year 1925 was 714,250, an increase over that of 1924 of 124,753.

The following table gives a comparison between the catch and marketed value of 1924 and that of 1925;—

Kinds of Fish		1924		1925	
		Quantity caught	Marketed value	Quantity caught	Marketed value
			\$		\$
Cod.....	cwt.	53,144	153,141	70,020	176,423
Herring.....	"	119,748	77,006	153,780	92,651
Mackerel.....	"	37,515	121,588	41,105	112,024
Smelts.....	"	50	150	40	120
Eels.....	"	30	210	20	140
Clams and quahaugs.....	brl.	2,175	12,800	2,700	16,300
Lobsters.....	cwt.	17,605	223,123	20,601	309,718
Marine animals, seal and hair.....	No.	109	130	912	1,185
Squid.....	brl.			75	750
Tongues and sounds.....	cwt.			25	175
Cod oil.....	gal.	3,000	1,185	8,781	3,410
Seal oil.....	"	327	164	2,604	1,354

COD

There was a good demand for cod and this fishery was prosecuted to a greater extent than last year. There was an increase in the catch and in the value.

HERRING

Herring were very plentiful, and there was an increase in the catch and in the value as well. A large part of the catch was smoked, and as the fish so treated were of a superior quality, the demand was constant and good prices were realized.

MACKEREL

There was an increase in the catch and a decrease in value. On account of transportation difficulties it is impossible to market these fish in a fresh condition; consequently, they have to be split and salted, and as the catches taken are unusually large it is practically impossible to prepare them properly. As a result the fish are of an inferior quality and can command only a low price.

CLAMS

There is an increase in the catch and in the marketed value.

## LOBSTERS

There was an increase in the catch and in the marketed value as well.

At the request of fishermen and packers the opening date of the lobster fishing season was changed from May 1 to May 10, and from interviews with both packers and fishermen I learn that the above change has been satisfactory to all.

## REMARKS

The mail boat *Lovatt* made her first trip to the Magdalen islands on April 12, the earliest crossing in years. This boat affords splendid passenger accommodation, and the public is well satisfied with the service given. The captain and his crew are very obliging and most attentive to their duties.

## REPORT OF J. B. SKAPTASON, INSPECTOR OF FISHERIES, PROVINCE OF MANITOBA, FOR 1925

The total production of all fish for 1925 shows an increase of 12,342 cwts. over 1924, for an increased market value of \$234,376.

1923		1924		1925	
Quantity	Market value	Quantity	Market value	Quantity	Market value
cwt.	\$	cwt.	\$	cwt.	\$
154,090	1,020,595	177,898	1,232,563	190,240	1,466,939

This increase may be almost entirely ascribed to the increased number of fishermen operating. While there has been a noticeable increase in some varieties of fish, such as whitefish and tullibee, this has been offset by shortage in pickerel catch. This is not confined to any one lake, every lake in the province is relatively alike in this manner.

## MARKETS

Market conditions have been good in most lines, and, over the whole, production show an increase of over half a cent per pound over 1924. Of the more important varieties, pickerel shows the largest percentage of increase in price, three cents per pound. This is offset by the heavy drop in production of 13,533 cwts.

Tullibee shows an increase in price of but a half cent per pound. If, however, a comparison were drawn between the two winter seasons 1924-25 and 1925-26, the difference in price would be much greater. In the former year tullibee was a drug on the market and much of the production had to go into cold storage, and was not actually marketed until the following summer. While the present winter season shows exceptionally good demand and prices, more than double in some instances, three times that of the previous season, but as the bigger part of November and December catch is not marketed until after the 1st of January, this difference in price reflects only partially to the benefit of the 1925 production.

The only species of fish to show a definite decrease in market value is sturgeon, which took a drop of 9 cents. This was caused by large importations of Russian sturgeon during the year for the American markets. It may be stated here that this is not likely to affect the market another year, as the quality of the Russian product is not considered in a class with Manitoba sturgeon and does not meet the requirements of the market.

The following are comparative prices of the chief or most important varieties of commercial fish as marketed in the last three years:—

	1923	1924	1925
Catfish..... per pound	10-0	11-1	10-6
Goldeyes, fresh..... "	5-0	4-4	4-2
Perch..... "	8-6	10-6	11-2
Pickereel..... "	8-4	8-5	11-5
Pike..... "	3-7	3-5	4-0
Sturgeon..... "	47-3	50-0	40-9
Trout..... "	7-5	10-0	9-0
Tullibee..... "	5-5	3-6	4-1
Whitefish..... "	7-1	9-7	9-5
For total catch..... "	6-6	6-9	7-7

*The Pas Sub-district*, comprising all waters north of Lakes Winnipeg, and Winnipegosis and includes the Big Saskatchewan river.

The winter production while considerably increased in whitefish, shows in common with other waters a material decrease in pickerel production. On the whole the catch is slightly smaller per man operating as against 1924. Moose lake produced the greater part of the catch, and those operating there had a good winter.

Clearwater lake, fished for the first time since it was closed in 1913, was a disappointment, there were five men fishing on the lake and they did not secure the 25-ton limit. The supply did not appear to have improved during the twelve years it was closed for commercial fishing.

Cold lake or Kississing lake, was fished for the first time. This lake is situated 120 miles north from The Pas. Fishing was good but a freight charge of 3 cents a pound took a big toll, and only the exceptionally high prices for fish made it a paying venture.

A very limited summer operation for whitefish was entered into on Moose lake, but natural difficulties of navigation (a sand bar across the channel entering the lake) proved an insurmountable barrier to a successful operation. The sturgeon operation on the Nelson was carried on much the same as in previous years, with one additional operator, Skuli Sigfusson. The catch fell considerably short of the previous year. The area between Cross lake and Kettle rapids with a limit of 100,000 pounds all of which was taken early in August, 1924, this year only produced 65,000 pounds. This is ascribed to two causes, the first a late spring which did not permit of commencing fishing until much later than usual, and then an early rise of water in the Nelson with accompanying debris and dirt which made it impossible to keep the nets clean, and as a result all nets were lifted early in July. Purvis Bros. and S. Sigfusson took 21,000 pounds in the Playgreen area.

On the Big Saskatchewan river, Cumberland and Cedar lakes the sturgeon fishing was not as good as in previous years, there were not so many men operating, and the catch per man was smaller. This is partly accounted for by flood waters and resulting dirt and debris, but the local Fishery Officer is of the opinion the fish are diminishing, and should another season show corresponding decreases, steps should be taken to close these waters for a few years.

*Lake Winnipegosis* shows a sharp decline in production for the year, 7,489 cwts., of all fish. This is distributed pretty evenly amongst all the chief varieties the lake produces. Whitefish, pickerel and jackfish (pike) show a decrease of about 15 per cent as against 1924. The higher prices more than recouped the operators for the short catch. With a drop in production of three-quarters of a million pounds as against 1924, the fishermen actually received \$11,076 more for their production.

The area of the lakes that seems to have suffered most is that from the north of Duck bay to the south end of the lake. It is in these waters summer pickerel fishing has been carried on since fall of 1921, and many ascribe the light catch, which really has been gradually becoming more noticeable, particularly in regard to pickerel, for the last three or four years, to this cause and advocate absolute closure of the lake for the summer.

The summer whitefish season on lake Winnipegosis is from the opening of navigation until the 15th of August, with a limit of 1,000,000 pounds. No attempt was made by any of the operators to take any part of this limit.

*Lake Manitoba.*—The total production is slightly higher than 1924, accounted for by 126 additional operators. There is a decline in both pickerel and perch, but all other varieties show a substantial increase. The decline in the pickerel catch is no greater than that of other lakes; it may, therefore, be said that the lake is fairly well holding its own in spite of the exceedingly heavy fishing it is subjected to. While the winter season 1925-26 commenced very favourably with an early freeze up and a good run of fish from the start, a storm and a break-up of the ice on November 26 caused the loss of nearly 3,000 nets in the south part of lake Manitoba. This not only was a great financial loss to the fishermen, but it delayed and disorganized their operations.

*Lake Winnipeg, Summer.*—The whitefish operations show marked improvement in catch over 1924, and when it is considered that one of the five companies, amongst which the 3,000,000 pounds limit of summer whitefish is distributed, did not operate. It may be said to almost equal the season of 1922.

The following are comparative figures for five years:—

1921	1922	1923	1924	1925
cwt.	cwt.	cwt.	cwt.	cwt.
29,270	24,724	14,554	12,311	20,195

In previous reports mention has been made of apparent increased showing of whitefish in what is known as the inner lake, from Swampy island south. This was well maintained during the summer and fall fishing of 1925. It will be seen there is a difference of 3,135 cwts. between the total summer catch of whitefish as recorded in the statistical returns and the above figures. That difference is accounted by whitefish taken in the south end of the lake during pickerel fishing operations.

The lake records another heavy slump in pickerel production, with many more men operating the catch is almost cut in half, 19,530 cwts. in 1924, reduced to 10,626 cwts. in 1925. This follows a drop of 40 per cent in 1924 against 1923. It has been mentioned that all the lakes of the province record a shortage in the pickerel catch. Lake Winnipeg has suffered this to a greater extent than any of the others.

Sturgeon fishing carried on in the bays in front of Berens and Pigeon rivers as well as Travers bay shows a decline in production of nearly 25 per cent, with many more fishermen operating. It is felt the time will soon come when it will be found necessary, in order to safeguard the perpetuation of the sturgeon in the lake, to again close it for a period of years.

Of the winter operations, the large increase in tullibee is outstanding. While the catch was much better, it was only partly responsible for the great difference in the two years' results. Another reason is the much earlier freeze-up last fall, which allowed of a greater percentage of the current winter fish to be brought to railhead before the end of the year. The tullibee operations during the winter season 1924-25 were the worst in years both as to prices and catch. The

present season promises much better; the catch will be above the average and prices exceptionally high, even rivalling the prices obtained in the later war years.

There is a marked increase in the attraction our waters hold for non-residents, as indicated by the recurrent annual increase in angling licenses issued. Lakes Killarney and Rock, a short distance from the American border, are the two lakes most frequented.

The following is a record of increase in non-resident angling permits for five years:

1921-22	1922-23	1923-24	1924-25	1925-26
18	22	37	118	249

Restocking of lakes in the southern and western areas of the province with pickerel fry from Gull harbour hatchery was continued as in former years. Lake Killarney also received an allotment of 600 small-mouthed black bass, obtained in exchange from the Fish and Game Commission for North Dakota.

There were fifty-three prosecutions in the province for various offences against the fishery regulations; 16 for use of illegal nets; 5 fishing without licenses; 1 fishing in prohibited area, St. Andrews locks; 13 possession in close season; 8 fishing in close season; 10 fishing in restricted area, lake Winnipegosis.

Fines collected, \$567.

Ninety-three confiscations, included in which are 182 gill-nets.

Proceeds of sales of confiscated articles, \$353.76.

Mr. Wm. A. Found, Director of Fisheries, visited the district early in September. One day of his stay was devoted to a meeting with all the fishery officers of the province, who had been called in for the purpose. The second day was entirely taken up with meeting fishermen and company representatives.

The meetings were most satisfactory and resulted in exchange of ideas and clarification of views.

## REPORT OF INSPECTOR G. C. MACDONALD, PROVINCE OF SASKATCHEWAN, FOR 1925

During the year 1925 there has been a total commercial production of fish from the province of Saskatchewan of 61,971 cwts. This is an increase over the previous year of 1,286 cwts. There has been an increase of 2,585 cwts. of whitefish, 307 cwts. of trout, and a decrease of 660 cwts. of pickerel and 1,140 cwts. of pike, with small changes in the coarser species. The increase of whitefish is made up by 254 cwts. on Jackfish lake, 2,381 cwts. on Ile a la Crosse lake, 319 cwts. on Dore lake, 1,026 cwts. on lac la Ronge, 160 cwts. on Green lake, and 667 cwts. on Peter Pond lake. Decreases in whitefish are shown on Pierce lake of 447 cwts., Makwa lake 128 cwts., Turtle lake 629 cwts., Waterhen lake 529 cwts., Okemasis lake 282 cwts., Cream lake 134 cwts., and Lowes lake 289 cwts. The catch of trout increased on Ile a la Crosse lake 32 cwts., La Plonge lake 127 cwts., lac la Ronge 358 cwts., and decreased 181 cwts. on Pierce lake and 59 cwts. on Cream lake. The decrease in the production of pickerel and pike is reported due to the early freeze-up of lakes in November which allowed the fishermen to operate in deeper water at the opening of the winter fishing season.

## WINTER SEASON

During the winter commercial fishing season the production was 57,587 cwts., with a market value of \$438,668. This is an increase of 2,126 cwts. of fish, with an increase of market value of \$2,618 over the previous season. The production of whitefish increased 3,454 cwts. and trout 347 cwts. This increase is largely on Ile a la Crosse lake, Peter Pond lake and lac la Ronge. There is a decrease of 656 cwts. of pickerel and 1,183 cwts. of pike.

## SUMMER SEASON

During the summer commercial fishing season the production was 4,384 cwts. of fish with a market value of \$40,977. This is a decrease from the previous year of 840 cwts. with a decreased market value of \$5,465.

## MARKETS

The markets during the winter season might be considered as being favourable. Only a small amount of fish were stored during the spring and have since been moved. The December market was fairly good and a higher price is being obtained for trout. Most fishermen are grading their catch of whitefish according to size which is found to be profitable to them. During the summer season the market opened favourably but dropped considerably during the early part of June when most of the fishermen ceased operations, but again resumed them later in the season when the markets improved. A considerable amount of green fish were shipped during the winter season which commanded a higher price than the frozen fish.

## EQUIPMENT

The total value of all equipment used for commercial purposes during the year was \$82,727, being a decrease of \$6,874 from 1924. There has been a decrease of 182 gill-nets, 33 hoop-nets and 7 gasoline boats. The decrease in gill-nets is largely accounted for on Lowes and Turtle lakes, where fewer men operated. The decrease in hoop-nets is due to less fishing on the Saskatchewan rivers, and the decrease of 7 gasoline boats was on Lowes lake where fewer fishermen operated during the summer.

## CONDITION OF FISHERIES

Considerable summer commercial fishing has been carried on in Lowes, Turtle, Jackfish and Okemasis lakes. The summer limit of 200,000 pounds on Lowes lake was reached on July 4 and the limit of 100,000 pounds on Turtle lake was not reached. The catch on Jackfish lake was about average. Summer operations were not carried on as extensively on Okemasis lake as in the previous year.

The winter limit of 100,000 pounds on Lowes lake was not reached owing to the short catch of whitefish and a portion of the lake considered good whitefish ground being included in the restricted area. On Turtle lake where the winter limit is 125,000 pounds, all commercial fishing ceased on January 31 when the limit was reached.

The catch during the winter on Jackfish lake was about average and on Okemasis lake it was not quite as good as in the previous season.

Dore lake, which has been extensively fished for a number of years, is beginning to drop slightly in the production, although the quality of the whitefish has improved considerably.

The production on Ile a la Crosse lake is some above the average and practically half the catch of whitefish would average over four pounds.

On lac la Ronge the catch has been about average. The whitefish are small and would average 65 fish to the hundred pounds. The percentage of trout taken has increased considerably.

It is expected that new waters, such as Snake and Sucker lakes will be opened up in the near future. At the present time one of the fish companies is cutting a trail to Snake lake from the Big river side.

#### DOMESTIC FISHING

A total catch of 15,583 cwts. of fish was taken during the year under domestic license. This is an increase of 942 cwts. over the previous year. There has been an increase of 1,895 cwts. of whitefish, 56 cwts. of tullibee, 53 cwts. of pickerel, and 6 cwts. of trout, with a decrease of 2,142 cwts. of pike and slight changes in the other species. During the year 960 domestic licenses were issued, an increase of 28 over the previous year. The total catch per license has been 1,604 pounds compared with 1,571 pounds during 1924.

#### ANGLING

There is an estimated total of fish taken by anglers during the year of 24,328 cwts. This is an increase of 1,280 cwts. over the previous year. Of this increase pickerel show 276 cwts., pike 853 cwts., goldeyes 14 cwts., perch 50 cwts., and mixed fish 87 cwts. The average catch per angler has been 62 pounds of fish as compared with 63 pounds the previous year. The estimated number of anglers is shown at 39,682. This is an increase of 2,892 over 1924. During the season 493 special angling permits were issued to non-residents of the province. This is an increase of 117 over 1924.

#### REGULATIONS

During the year there were 90 prosecutions and a conviction secured in all cases resulting in fines amounting to \$396.50 being imposed, with additional court costs to the defendants of \$248.45, as follows:—

Fishing during close season.....	45
Fishing with illegal apparatus.....	31
Fishing without a license.....	11
Illegal possession of fish.....	3
	<hr/>
	90

There were also 84 confiscations made during the year, as follows:—

Legal apparatus.....	33
Illegal apparatus.....	29
Illegally caught fish.....	22
	<hr/>
	84

There were 52 sales of confiscated articles made amounting to \$260.60.

#### FISHWAYS AND DAMS

There has been a new fishway constructed in Pasqua dam to replace the one washed out by the spring freshets. Minor repairs have been made on the fishway and dam on the Turtle river near Dulwich. The dam at the north end of Cowan lake has been taken over by the Department of Public Works and considerable improvements have been carried on by them. A new fishway has been constructed in the Canadian Pacific Railway dam south of Melfort. All dams and fishways in the province are now reported to be in serviceable condition.

REPORT OF INSPECTOR R. T. RODD, PROVINCE OF ALBERTA,  
FOR 1925

## INCREASES

In the commercial fishing for 1925 there is an increase in the total fish shipped of 1,059,900 pounds of fish with a value over that of 1924 of \$119,397. This is due chiefly to the summer coarse fish fishing increase at Lesser Slave lake, and also to the resumption of operations at lac la Biche. Although the limit of production of 1,500,000 pounds at Lesser Slave was reduced to that of 650,000 pounds and the seasons changed, it will be noticed that the enormous increase in coarse fish practically amounts to 500,000 pounds which more than covers the decrease in the whitefish. The fishing was excellent for pike and pickerel at Lesser Slave but poor for whitefish. At lac la Biche where the limit was reduced to that of 300,000 pounds the fishing for whitefish was extremely good, the catch for coarse fish formerly preponderant in this lake being light. The district around lac la Biche also produced heavily in whitefish as well as the coarser varieties. A large increase will be found from lac Ste. Anne, a lake that has been heavily fished in the early years of the province because of its accessibility, and I am glad to report the comeback of this lake. Other lakes such as Wabamun, Sturgeon, Moose and the small lakes around this district gave a steady production. The winter operations show an increase from Winnifred lake, where fishing was resumed after some three years rest, and where the production during the first three weeks was over 150,000 pounds of whitefish, the entire catch being shipped in a fresh state. Pigeon lake, which, in spite of heavy fishing for many years past because of its proximity to the thickly settled districts between Edmonton and Calgary, still continues to produce heavily.

## DECREASES

I beg to report that the production of fish from Cold and Primrose lakes shows a decrease in the catch of whitefish. This was caused mainly by the limit of production being placed on the lakes. The catches on these lakes are, however, reaching the limits imposed long before the end of the season, and I am convinced that they will never be depleted so long as the present limit is observed. A slight decrease in trout from Peerless lake was more than balanced by an increase in whitefish. Other lakes in the Lesser Slave district were steady in production of whitefish. Summer fishing for trout commercially at Cold lake is to be discontinued by authority of the department, owing to the increase in the amount of angling now carried on.

## MARKETS

The market for fish was decidedly better during the past year, and good prices prevailed both for fishermen and operators. Particularly was this to be noticed in the market for coarse fish. There is now a good demand for filleted jackfish and the refrigerator plant at Faust ran to capacity. The production of fresh fish, however, which has increased greatly, being produced at a large number of lakes, several car loads even being brought in from Peter Pond lake a distance of about 80 miles has affected the market for frozen whitefish somewhat. Several new companies have been formed on a co-operative basis by the fishermen themselves and one operating at Winnifred lake got good results. Retailers in the larger cities report a good year. There is a very healthy and optimistic outlook for the present year all around.

## TRANSPORTATION

Assistance from express companies has been good and no trouble received in obtaining all the cars needed. The companies are keen for the business, although the rates are discriminating from an Alberta viewpoint. Trails and roads were cut into Winnifred lake at some considerable expense, and the trail to Peter Pond lake further improved. Some trouble prevailed at this point during the winter season January-February with considerable loss of fish, owing to the complete thawing of snow by Chinook weather.

## EQUIPMENT

There has been a decided improvement in the equipment used, in spite of the heavy loss caused at Lesser Slave and lac la Biche through unusually heavy mid-summer storms. The latter interfered seriously with the fishing at Lesser Slave lake. A new smoke house has been started at Edmonton and is doing particularly well, at this plant small whitefish are smoked, and also smoked fillets of jackfish, the latter being a particularly well finished article. This plant, together with the refrigerator plant at Faust will handle any surplus of coarse fish that may be caught and can now be profitably marketed. Further developments on these lines may be expected during the coming year. New cabins are being built for summer operations at lake Athabasca and it is expected that refrigerator barges and re-icing plants will be built this spring. Several new gasoline launches and boats were used for the anglers at Cold lake and new hotels were also built at this resort. New cabins for the fresh fish business costing around \$2,000 have been built for the Peter Pond district, as also many new ice-houses. The Government has built a large wharf costing around \$15,000 to \$20,000 at lac la Biche for the grain trade. This will, however, also be used by the fishermen of this lake and will be a decided improvement.

## OBSERVATIONS OF THE REGULATIONS

The number of prosecutions from the 1st of April was 39, an increase of 16, and the confiscations numbered 27, an increase of 7. A great deal of assistance was given by the various Fish and Game Protective Associations particularly from the Northern Alberta Fish and Game Protective Association. The number of honorary guardians number 57, some of whom gave valued assistance during 1925. Below is detailed the offences against the Fisheries Act:—

1	prosecution under section	7	(excess of nets).
1	"	17	(illegal mesh).
2	"	24	(c) (fishing in prohibited water).
6	"	1	(fishing without license).
3	"	32	(fishing without permit).
15	"	20	(a and b) (fishing in close season).
7	"	29	(Fisheries Act) illegal possession of fish.
1	"	83	(Fisheries Act) assisting those fishing in close season.
2	"	77	(Fisheries Act) fishing in closed waters.
1	"	75	(Fisheries Act) pollution of water.
39			

## IRRIGATION SYSTEMS

During the summer considerable investigations were carried on regarding the destruction of fish in the Lethbridge Northern Irrigation System with a final and thorough investigation when the water was being shut off in October. The loss of fish in this system is very small, while there is every possibility of excellent coarse fish fishing being developed in the Keho reservoir, in a few years, through being stocked by fish passing through the main canal from the

Old Man river. In the Chin reservoirs on the Southern Alberta Irrigation System, Lake Newell in the Brooks district, Chestermere lake in the Calgary district, all in Canadian Pacific Irrigation Systems, and lake McGregor on the Canada Land Irrigation System, good angling is now the rule.

#### DAMS AND FISHWAYS

A new dam and fishway was built by the Canadian National Railway on the Blindman river at Burbank to replace that constructed the year previous, and which was carried away by the ice and high water in the spring. The National Railway has also under construction a fishway in their dam at Waskatenau on Waskatenau creek. The Canadian Pacific have just completed a large dam in the Pipestone creek, near Wetaskiwin, and have installed, at considerable expense, a fishway 36 feet long, with a return section, which brings the lower end or opening back to the foot of the dam. This fishway is strongly constructed and built to scale and should function properly. All other dams and fishways previously reported are in good repair.

#### EXAMINATION OF LAKES AND STREAMS AND STOCKING THEREOF

Nine lakes in the Edmonton district were examined during the season. Six were found suitable for stocking. Four lakes in the district west of Edmonton were stocked by transfer, with perch and pickerel. During September, streams in Buffalo, Prairie, Jasper park and Obed lakes, west of Edson, were stocked with Rainbow trout fry. Some assistance was given the Superintendent of the Banff hatchery in the stocking of the streams tributary to the Red Deer river. The stocking of streams in the southern part of the province was handled entirely by the hatchery superintendent with some assistance from the overseer of that district.

#### ANGLING

Excellent catches of lake trout were obtained at Cold lake during the summer, 22,437 pounds of trout being taken by 280 anglers, the largest trout taken weighing 53½ pounds. The angling in the Athabasca and its tributaries was poor, very few good catches being reported. Numerous reports have been received of the excellent fishing for rainbow trout that was obtained in these streams before and during the construction of the Canadian Northern and Grand Trunk lines. The general opinion is that all methods of fishing were resorted to during the construction of these lines, nets and dynamite being used largely, with the above result. It was also reported that fishing was not good in the Jasper park waters, the fish being plentiful in Pyramid lake only, but difficult to catch. These waters require intensive restocking if good fishing is to be expected. Very little angling was carried on in the Red Deer, although a few good catches were reported. Angling in the Bow river and streams south to the International boundary was generally very good, and especially so in the Highwood river, Willow creek and the Bow river at certain points. Good catches of large rainbow trout were taken from the Bow river thirty miles east of Calgary. Reports have been received from expert anglers stating that the fishing was never so good or such good sport obtained before as was the case in the Highwood river last season, and it has also been reported that the fishing in Willow creek was better than it has been for twenty years. At least 25 per cent of the catch in the Highwood river was rainbow trout placed there from the Banff hatchery, introduced for the first time into this stream in 1919. Previous to this the only trout indigenous to this stream was the native cutthroat trout. Fishing in some of the streams tributary to the Old man river was excellent, while in others only fair, the result of over-fishing during the previous year. Angling for pike in the

irrigation reservoirs continued good. Fishing for grayling was reported by the overseer to be the best ever known in and around Calgary. A small amount of goldeyes were reported caught in the Bow river below the C.P.R. irrigation dam at Bassano. Great scarcity of this species was reported from the Red Deer, where in former years good catches were always obtained. Good catches were reported in the lakes around Edmonton from an angling point of view in perch, pickerel, and pike.

REPORT OF CHIEF INSPECTOR MAJOR J. A. MOTHERWELL,  
WESTERN FISHERIES DIVISION (BRITISH COLUMBIA),  
FOR 1925

It is with much pleasure that I report another excellent year in the fishing industry of British Columbia. Generally speaking, market conditions have been better and both the fishermen and the owners of the packing establishments have had a prosperous year.

SALMON

On reference to statement No. 1, it will be found that only in the year 1924 has the pack of salmon exceeded that of 1925, and only then by 26,883 cases.

The pack of sockeye exceeded that of 1924 by 23,042 cases, and is the largest pack of this variety since 1915. In view of the small quantity packed in 1921, considerable apprehension was felt as to this year's prospects. The satisfactory figures are largely the result of the extraordinarily good run to Rivers and Smiths inlets, 201,186 cases being taken from these two areas. This is by far the largest pack on record. The next biggest run was in 1915, when a total of 162,651 cases was packed. In practically every area, apart from the Naas river and the Fraser, there was an increased run of sockeye, and in spite of the large pack the spawning areas were found to be well seeded.

At the Naas river the total pack of 20,351 cases of sockeye is a fairly satisfactory one in view of the fact that the brood years of 1920 and 1921 were so poor. The runs to the Naas river, however, are obliged to run the gauntlet of the numerous traps and seines in Alaskan waters, and it is difficult to intelligently understand the significance of the pack figure.

On the Skeena river it was not expected that the pack would be large in 1925 owing to the small runs in the main brood years of 1920 and 1921. The showing, however, is a satisfactory one in view of the conditions.

The run to the Fraser produced only 31,523 cases on the Canadian side and 106,064 in Puget sound. These figures are very similar to those of the brood year of 1921. The quality, particularly of the Fraser sockeye this year, was unusually good.

The pack of cohoes in the whole province shows a very considerable increase since 1920, but as in the case of pinks and chums, the intensity with which this variety has been fished has depended altogether on the market conditions. In 1925 the demand for cohoes was unusually good, largely due to the favourable terms of the treaty with Australia, which gives Canadian salmon approximately \$1.50 preference over that of other countries.

This being an off year for pinks in the Queen Charlotte islands, the total for that district is fairly small. On the Fraser it was the big pink year and there was an excellent run. Owing to the fact, however, that the pink run passes through the waters of Puget sound before reaching the Fraser river the Canadian fishermen have to be satisfied with what the American fishermen leave. By the statement enclosed it will be observed that although the Puget sound can-

neries packed 555,848 cases of pinks the Fraser river canneries only received 99,800 cases although the very large percentage of the pinks coming into Puget sound waters are on their way to Canadian streams.

The chum pack was a record one with a total of 607,904 cases. In addition there was a sufficient number of chum salmon dry salted to make 229,111 cases more. It is felt to be very doubtful if the supply of salmon can stand such an annual strain.

With the considerable increase in the amount of fishing gear in the water, particularly purse-seines, which have increased by 87, the pack shows that there was not nearly as good a supply of fish available as during the previous year. It is felt that in order to maintain the supply of all the varieties of salmon, we must, in view of the more intensive fishing, take some measures which will conserve our salmon for posterity. There is a pack limit which it is unsafe to exceed, and if the fishing operations are to increase in intensity as they have in the past two or three years there must be no hesitation in placing in force such restrictive measures as will adequately take care of conservation. There would appear to be little prospect, under present conditions, of depleting the sockeye runs. The situation in the case of the pinks and chums is a very different and difficult one. The industry must expect that very drastic measures will be taken if found necessary to take care of the situation.

rather well to

because they will sell off at once and at a high price. HALIBUT

This was the second year of the period covered by the International Halibut Treaty and there was again enforced a close season of three months, from November 15 to February 15. As will be seen by perusal of statement No. 7, there was a falling-off in the quantity landed in British Columbia ports of 13,142 cwt. In addition to the closed period there were other factors which resulted in a short catch in spite of the increased amount of fishing equipment used. The prices obtained were not as attractive as those during the previous year, due to several reasons. One undoubtedly was the fact that during 1924 the cold storage plants had laid in large stocks of the frozen variety, expecting to unload during the closed season. These plans, however, did not work out, and the result was that when the season opened again on February 15 there was a large quantity of frozen halibut still held and which prevented the expected demand for all the fresh variety that was brought to port. As the closed period was expiring all the fishing equipment went to the banks at practically the same time and the result was that unusually large quantities were offered for sale and which the market was not in a position to absorb. On February 26 fifteen American and four Canadian boats arrived at Prince Rupert with approximately 493,000 pounds of fresh fish. Due to the quantity which had already been purchased since the opening of the season, the highest price offered at Prince Rupert was 7 cents, which the fishermen on that day refused to accept. Six of the American boats immediately left for Seattle, hoping to obtain better prices. It is interesting to note that the decrease in the quantity of fresh halibut landed at Canadian ports during the year was accounted for entirely by the operations of Canadian vessels, the quantity landed by Americans being larger than the previous season. Undoubtedly this condition is due largely to the closed season during the winter months. Previous to the Halibut Treaty the Canadian boats during the winter, due to weather conditions, could only fish in the waters near the Canadian ports. The operation of the treaty regulations prevents this winter fishing by Canadians.

In August the United States Tariff Commission held a hearing at Seattle for the purpose of discussing the report prepared by its experts who had been working during the previous year in the collection of statistics of all kinds as affecting the halibut industry in relation to the American tariff. An opportunity was given all interested to express themselves in order that the recommendation

which the Tariff Commission was making to the President of the United States looking to a possible reduction or increase in the 2 cents per pound duty, would only be made after the fullest opportunity had been given everyone concerned to place facts before the commission. At this date it is not publicly known what the recommendation to the President was, but any action resulting therefrom will be looked forward to with very great interest by Canadian halibut operators particularly.

A development of some interest during the year was the shipment by a Japanese firm of Kobe, Japan, of 860,000 pounds frozen halibut consigned to Vancouver per the ss. *Haruna Maru*, which arrived at its destination during the latter part of August. This consignment was frozen by the brine freezing method, but it appears that the fish were not properly glazed or properly handled while in storage before reaching the Canadian side. As a result their exterior presented an appearance which operated against their profitable sale. The prices obtained for this shipment, which was on consignment, would appear to have been not sufficiently attractive to justify further attempts, although nothing is known of the future intentions of the consignors.

#### HERRING

By statement No. 8 it will be observed that the year's pack of dry salted herring was the largest on record, although the fall run to the Barclay sound area on the west coast of Vancouver island was a very poor one. In fact for four weeks there were hardly any herring at all caught. The run on the east coast, however, more than offset this scarcity.

The dry salting branch of the fishing industry, owing to the department's policy of eliminating the Oriental, will shortly be practically entirely in the hands of Canadian whites and Indians.

#### PILCHARDS

The pack was 37,182 cases, compared with 14,898 the preceding year. In addition, owing to the fact that pilchards were for the first time permitted to be processed in reduction plants, 495,653 gallons of oil and 2,083 tons of meal were produced on the west coast of Vancouver island. These operations were more or less of an experimental nature and it is felt that the results obtained have been sufficiently encouraging to warrant a considerable expansion in the reduction works industry.

#### WHALING

Whaling operations again during the year showed a falling-off, with a total catch of 351, as against 415 the preceding year. The station at Rose harbour, situated at the south end of Queen Charlotte islands, obtained the most satisfactory results, with 176 whales. In this connection it is interesting to note that the whaling companies in Alaska had a most successful season.

#### FUR SEALS

There were 4,465 fur seal skins taken by the Indians operating as usual in canoes and with spears. The previous season only 2,232 were obtained. The price averaged \$10 per skin.

#### DESTRUCTION OF SEA LIONS

The sea lion hunting expedition met with even better success than the preceding season and accounted for 1,658 adults and 1,169 pups, a total of 2,827. This is the largest bag so far obtained. Operations were conducted on the

Virgin islands and Pearl rocks opposite the Rivers and Smiths inlets. An interesting feature observed was the paucity of yearling lions, not more than 50 being observed on both the Virgins and Pearls, which would appear to show conclusively the results of the preceding year's killings.

The gratitude of the gill-net fishermen was again demonstrated by the liberal presents of cigars to the crews employed in the destruction of sea lions and demonstrates the attitude of the fishermen who stated that it was now observed outside of Rivers inlet that the sockeye schools are not broken up as heretofore but run steadily to the inlet. The largest catches of sockeye were made during the worst two weeks of bad weather the preceding year, which was quite unusual.

It is hoped that facilities will shortly be available which will permit the extending of the sea lion operations to include other points where they gather in large numbers on the rookeries and where they could be fairly easily killed.

#### PATROL SERVICE

In the protection of the fisheries during the year, a total of 91 boats was used, 26 of these being the property of the department and 65 being chartered. In addition there were three seaplanes stationed at Prince Rupert and a fourth one was available at the Seaplane Station in Vancouver on call. During the year the C.G.S. *Malaspina* logged 19,956 miles, and the *Givenchy* 15,164 miles. With the fishing operations becoming more intense each year the work of the patrol boats continues to increase and it is imperative that the two large steamers particularly be kept constantly on patrol. Their work is seriously interfered with by lifesaving duties and calls from other departments.

The flying boats consumed 296 hours 40 minutes as against 152 hours 8 minutes, the previous year. It is felt that without the aid of the Air Service the protection of our salmon would be a matter of very grave concern indeed. Even under the best of conditions it is not possible to provide a 100 per cent efficient service. Without the planes the number of boats chartered would require to be increased and the service obtained from them would not give the same results as are produced by the flying force.

#### REGULATIONS

The sum of \$3,164.20 was realized from fines and sales during the year as a result of 138 prosecutions. With the increased demand for British Columbia salmon there is a greater incentive to disregard fishing boundaries and closed periods. This naturally results in a greater number of prosecutions, which is regrettable as it is far more desirable to prevent violations than penalize operators for breaches of the regulations.

The number of salmon purse-seines issued has increased from 92 in 1912 to 329 in 1925 but on the other hand I am glad to be able to report that in the same period the number of salmon drag-seines has been reduced from 193 to 37.

#### REDUCTION IN ORIENTALS

The department's policy of eliminating the Oriental from the fisheries of the province with a view to placing the entire industry in the hands of white British subjects and Canadian Indians appears to be working out well as is shown by statement No. 10, which covers a very large proportion of the total number of licenses issued which Orientals were permitted to hold. In the salmon gill-net operations the Orientals during the year 1925 held only 24 per cent and in the salmon trolling 10.5 per cent of the total number issued in the province.

In the herring dry salting operations a further reduction of 25 per cent was made during the year, making a total of 50 per cent, and in the case of salmon

dry salting a first reduction of 25 per cent went into effect and it is the intention to continue this percentage each year until these industries are entirely in the hands of Whites or Canadian Indians.

#### SCIENTIFIC INVESTIGATION

In March a meeting was called in Seattle of executive officers of the Fishery Departments of the Dominion of Canada, the province of British Columbia, Alaska, and the states of Washington, Oregon and California, with a view to the co-ordinating of the work being conducted separately looking to an improvement in the present fish cultural operations and the obtaining of information which would result in a better understanding of the salmon fishery conditions as affecting the whole Pacific coast of the continent. An association was formed known as the International Pacific Salmon Investigation Federation. One of the outstanding results of this conference was the tagging operations in connection with the runs of spring, coho and sockeye salmon, which provided some extremely interesting information with regard to the destination of the several varieties passing a number of points. The tagging operations should be extended to cover all varieties of salmon during all stages of the runs and in as many localities as is possible and with the information obtained therefrom conservation measures could be much more intelligently arranged. A more detailed report will be forthcoming from the Biological Board and will be found elsewhere in this publication.

#### POWER BOATS IN SALMON GILL-NET FISHING, DISTRICT NO. 2

Although since the year 1923 power boats have been permitted in District No. 2 in salmon gill-net operations, it is interesting to note that out of a total of 2,866 licenses, only 242 were fished by means of power boats, as is shown by statement No. 11.

#### REMOVAL OF OBSTRUCTIONS IN SALMON STREAMS

During the year the sum of \$4,210.49 was spent in the above work but this of course does not represent the quantity of work performed by the engineering staff. A detailed report of Senior Engineer J. McHugh appears elsewhere in this report and will be found to be of considerable interest.

#### WAREHOUSE AND MARINE WAYS, FRASER RIVER

The construction of the accommodation at Poplar island, Fraser river, for the purpose of storing fisheries equipment and stores and repairing the patrol boats, was completed during the year and has proved most efficient and economical. In addition to the annual overhaul of the boats of the Fraser river and Vancouver district all but one of those used in District No. 3 are brought down each year to Poplar island and the saving to the department has been very considerable and well justifies the expense of providing the accommodation. While the ways and machine shop were not completed in sufficient time to take care of our boats for the annual overhaul in the spring of 1925, the estimates of the cost of the repairs to be undertaken in the spring of 1926 will show a saving of approximately \$2,262.

#### CONDITIONS ON SPAWNING GROUNDS

*Queen Charlotte Islands.*—Generally speaking this is not a sockeye district although there is a small run each year to the Naden and Yakoun rivers. It is only in the even numbered years that the large run of pinks occurs and in the odd numbered years the operators depend practically altogether on the

supply of chums although on the east coast there is a fair quantity of pinks, even for an off year. The department has spent considerable money during the past few years in clearing the Yakoun river of obstructions and the result has been that now all salmon can easily ascend. The spawning grounds generally, apart from some of the east coast streams, show a satisfactory quantity of spawning chums.

*Naas River.*—In this area was found the largest number of spawning sockeye that has been observed for years and conditions at the fishway at Meziaden lake were found to be eminently satisfactory. The salmon have no difficulty whatever in passing up and at the time of inspection this structure was found to be full of fish on their way to the upper reaches. The run of spring salmon was also a very satisfactory one and the cohoes were found to be ascending in considerable quantities.

*Skeena River.*—There has always been a run of sockeye to the Exstahl river but owing to the character of the country, which makes the inspection trip of a very hazardous nature it was not until this year that an inspection was made. It would seem that this area is not as important a one from the standpoint of sockeye salmon as the Lakelse or Babine districts but quite a fair supply of this variety of spawning fish was observed. Conditions on the spawning beds would seem to justify the impression that the Exstahl district is an important one from the standpoint of the spring salmon.

In the Lakelse area a splendid run of sockeye was found and all the spawning streams were well seeded in addition to over eleven million eggs being taken at the hatchery.

In the streams entering into the Babine lake, which area is the most important one with relation to the Skeena river, a most satisfactory supply of sockeye salmon was found and the inspecting officer estimates that conditions were 20 per cent better than in the previous season. Pinks were also very numerous in this area and the beds usually resorted to by this variety are well stocked.

*Central Division.*—On the whole there was a satisfactory run of sockeye to the streams in this division although the fishery officers were somewhat concerned on account of the dry season which resulted in the salmon in many places having difficulty in passing up the streams. However, an adequate proportion of the run seems to have succeeded and the conditions on the spawnings beds are reasonably good. Owing to the low water the fall varieties, particularly the pinks, were obstructed for some time and while not as many reached the spawning beds as could be desired at the same time it is felt that on the whole the seeding was fair.

*Bella Coola.*—The supply of sockeye on the spawning beds of the Bella Coola river was found to be the best for some years. The quantity of springs was only fair and a small supply of pinks and chums was observed. The number of cohoes was satisfactory. In the Kinsquit river the supply of sockeyes while not a heavy one was fairly good. The runs of springs, pinks and chums were light although an adequate showing of cohoes was observed. In Dean river while the spawning area at the present time is limited due to a fall there was quite a fair run of springs and cohoes noticed on the spawning beds. Speaking generally of the whole district, while the fishing was intensive, it is felt that a reasonable proportion of the runs of the several varieties succeeded in reaching the spawning areas.

*Rivers Inlet.*—The report received from the inspecting officer in this district is an unusually satisfying one and shows that large quantities of parent spawning sockeye salmon were present on practically all the spawning beds. In addition the hatchery was easily filled to capacity in a short period and the quantity of sockeye packed at the canneries operating was much the largest

in the history of the district. The hatchery operations together with the work done in the way of keeping the streams clear of obstructions has undoubtedly been of immense benefit to this river.

*Smiths Inlet.*—At this point, in spite of a pack of 33,764 cases of sockeye, there were great quantities found on the spawning grounds.

*Alert Bay.*—The principal sockeye stream in this area is the Nimpkish river. Notwithstanding the fact that there was more fishing equipment in the way of purse-seines and drag-seines operating at this point than ever before, the escapement of sockeye to the spawning grounds was such as to provide for a most excellent seeding. Only four days a week fishing was permitted from the first of the season and this fact no doubt is largely accountable for the good supply of salmon passing. There was also an excellent run of cohoes as well as spring salmon although that of pinks was light. A plentiful supply of chums also ascended the stream.

At Glendale cove, into which flows the second best sockeye stream in the district, the supply this season was one of the best for years. The runs of pinks and chums were also quite satisfactory. In such rivers as the Tsulquate, Nahwitti, and Wakeman the supply of pink salmon was very good. The quantities of pinks found on the spawning grounds over the balance of the district, however, was only fair. Generally speaking the supply of chums through the district was satisfactory. This cannot be also said of the cohoes with the exception of such points as Thompson sound, Qualate river, Howea sound, Call creek and Adams river.

*Quathiaski District.*—This is not a particularly good sockeye area and the supply at Hayden creek was only fair. The same applies to Phillips river. Apart from the chums no variety of salmon was very plentiful on the spawning grounds although there was a satisfactory quantity of cohoes at Salmon river, Phillips river and Homalko river. At Campbell river, which is well known for its excellent Tyee (spring) salmon sport fishing, there was an adequate supply of this variety.

*Comox.*—This is not a sockeye area and 1925 was an off-year for pinks. The supply of cohoes on the spawning grounds was found to be very light with the exception of Little river and French creek. This also applies largely to chums although there was a good run at Coal creek, Waterloo creek and Big Qualicum river.

*Pender Harbour.*—There was practically no sockeye in this area apart from Sauch-en-Auch creek. For some reason the quantity observed on the spawning grounds was very unsatisfactory although the fishway installed at this point is quite efficient. The run of pinks on the whole was fairly good. The streams in the Jervis inlet area were particularly well seeded. A satisfactory portion of the cohoes and chum runs reached the spawning grounds.

*Nanaimo.*—This is not a pink area. The quantity of cohoes was only fair. In the case of the chums, apart from the Nanaimo river, the spawning areas were not found to be very well stocked.

*Cowichan.*—There are no sockeye in this sub-district. The spawning beds of the Cowichan, Koksilah, and in fact practically all the streams show a plentiful supply of cohoes salmon. Chums ran in considerable quantities to the Cowichan and Koksilah and the spawning areas were well seeded.

From a standpoint of sporting fish the seeding of the beds by the steelhead and the cutthroat trout has been quite good.

*Sooke.*—In the Sooke river and Muir creek a good run of cohoes was observed. The supply of chums generally was also most satisfactory although Demanuel creek showed fewer in proportion than other streams.

*Alberni*.—Apart from the Somass and Stamp rivers, the Anderson river, and a few in Nitinat, there are no sockeye in this area. The supply of this variety to the Anderson river was only fair although the usual take of eggs was effected at the Anderson Lake hatchery. The spawning grounds around the Somass lake were plentifully supplied and the run which reached as far up the Stamp river as the falls seem to be somewhat larger than usual. Owing, however, to the condition at the falls these salmon are practically all prevented from reaching a larger area. It is hoped that some means can be devised in the near future whereby a more extensive spawning district can be opened to this run. The supply of cohoes at Stamp river was excellent and owing to some assistance being given by means of reducing the falls practically all reached the good spawning area above. At the Sproat, San Juan, and Gordon rivers there was a plentiful supply of this variety also. The Alberni district is not a pink area. The run of chums, apart from the San Juan and Gordon rivers, was not particularly satisfactory.

The Nitinat area does not appear to have yet recovered from the extremely intensive fishing of some years ago.

*Clayoquot Sound*.—Sockeyes only run to the Kennedy and Medgin rivers. The spawning beds in the former district were very well seeded and there was also a satisfactory supply at the latter. With regard to cohoes, on the whole the supply was good, particularly at Hesquot river, North and East bay, Atleo river, Bauden bay, Trout river, Tronquile creek, and Deer creek. This is not a pink area. The chum run was quite good and the spawning grounds were practically all found to be abundantly seeded.

*Nootka Sound*.—This is not a sockeye or pink district. An inspection of the spawning beds did not show a satisfactory supply of cohoes, but on the whole the supply of chums was sufficient to provide a good return for future years. This applies particularly to such streams as Conuma river, Deserted creek, Sowand river, and Espinosa river.

*Kyuquot*.—There are no sockeye streams in this sub-district and there were few cohoes found on the spawning beds. This also applies to chums.

*Quatsino*.—Sockeye are few in this area and they are of the creek variety. A fair supply was observed at Marble river and a few at Mahatta river. Satisfactory conditions were found with regard to the supply of cohoes, generally speaking, and this applies also to the chums. There were few pinks to be found.

#### FRASER RIVER WATERSHED

In the Stuart Lake district the return of parent sockeye salmon this year has been the largest since 1909. The result of the intensive planting of eyed sockeye eggs on the natural spawning beds in this area could first be expected to appear during the run of 1925, and judging from the most satisfactory showing of returning fish there would appear to be every justification to feel that the fish cultural operations as being conducted at present are responsible for the satisfactory conditions as found this year on the spawning grounds. The superintendent of the hatchery at Stuart lake states that in several of the streams visited he observed as many as 500 or 600 spawning sockeye, although only a portion of each stream was inspected. The Indians took at least 1,200 sockeyes for their winter food purposes. While of course 500 or 600 fish would not go very far in seeding such a large area as the Stuart lake system, at the same time, when it is remembered that for years past there have been hardly any sockeye at all seen, this year's conditions are decidedly encouraging.

The Bowron Lake district showed practically no sockeye, the dozen or so observed being hardly worth mentioning. In the Quesnel district the local officer estimates that about 500 ascended the Upper Horsefly and McKinley rivers. A

thorough inspection was not made of the other Quesnel lake tributaries, therefore no information is available. The conditions are estimated to be very similar to those of four years ago.

The local officer reports that he found the sockeye run to the Chilco river the best since that of four years ago and he feels that it is slightly better than that of the previous cycle year.

In August Mr. C. W. Harrison, the Inspector of Hatcheries, made a thorough inspection of Chilco lake and its tributaries. The impression prevailed that this was one of the main spawning areas for the sockeye passing above Hells Gate. The inspecting officer, however, found that while there does exist a limited suitable spawning area, in his opinion Chilco lake has not been a very great factor in the large sockeye runs of previous years. It is possible, however, that Chilco river itself and Whitewater river and lake may have been used extensively by these salmon, and it is expected that a thorough examination of these waters will be made by Mr. Harrison during 1926.

In the Anderson-Seton lake area, for the first time in a considerable number of years, comparatively fair quantities of spawning sockeye salmon were observed. The few thousands observed of course are only a very small fraction of the runs which used to ascend this system, but it is sufficient to be encouraging. It has been suggested that these were fish which were on their way to the upper reaches of the Fraser river watershed but which on account of being held up, at least temporarily, at the canyon in the Fraser river just beyond the junction with Bridge river, have dropped back the five or six miles to the Seton lake system. This suggestion has been investigated as thoroughly as is possible and the writer feels that such a conclusion is not warranted.

For the preceding four years particular attention has been given to the upper reaches of the Anderson-Seton lake system from the Pemberton hatchery and considerable quantities of both eyed sockeye eggs and fry have been planted each year under the best of conditions. There would appear to be little doubt but that the returning fish this year are the result of fish cultural operations. This is borne out by the statement of Guardian Mr. T. E. Scott, who has had a considerable number of years' experience in the district. He states in part as follows:—

"In reference to Seton creek run of sockeye—knowing the difficulty at Bridge river and this being the first time that salmon of this species have appeared in any quantities for years. I reported on October 9, 1925, that it might be that salmon had drifted down and gone up Seton creek. My next visit sockeye had increased greatly, and in good condition, so of course this idea exploded. I followed the course of sockeye from Seton creek to Gates creek or Anderson creek, a distance of over thirty miles. It is out of the question to think for one minute that salmon, weak and battered, could drop back to the Fraser river eight miles and go over thirty more."

It is certainly not at all likely that fresh run fish would be appearing in the Seton system if they were headed for points above Bridge river canyon, but it is far more likely that any fish which had dropped back after fighting the canyon for some time would be considerably battered.

At the Bridge River canyon the Indians have been in the habit of taking their food supply from the salmon which are gathered in the safe resting places at the foot of the fast water. It is discouraging to find that after the best return of parent sockeye salmon in years to the upper reaches of the Fraser some 7,000 should have been taken by the Indians at this point. It will be appreciated that these fish when they have already reached a point so far up the Fraser river are of immense value from a standpoint of natural reproduction on the spawning grounds in the upper reaches of the watershed.

In the Shuswap-Eagle river district a better showing of sockeye salmon was observed than usual. At the Adams and Little rivers the local guardian estimated that he had seen approximately 20,000 spawning sockeye. There were very few observed in Eagle river.

A considerable improvement was observed in the run of salmon to the Thompson river watershed. This applies to the spring and sockeye varieties.

At Hells Gate the conditions were very similar to previous years, and although salmon were delayed at certain times for short periods they eventually were able to pass beyond this point.

To the Birkenhead river again this year there was a splendid run of sockeye. Forty million eggs were collected at the hatchery and large numbers of sockeye spawned naturally. There is no doubt but that the run to this stream is being well maintained. At Harrison lake no unusual number of fish was observed. A fair number spawned in Morris creek and in the rapids at Harrison river.

At Cultus lake a fair supply of sockeye passed up to the spawning beds and all were permitted to spawn naturally. The run, though satisfactory, was not as large as that of the preceding year.

At Pitt lake conditions continue to be excellent and the quantity of spawning parent sockeye ascending the upper streams is being well maintained.

In the Nicomekl and Serpentine rivers, which are two of the chief sport fishing streams in the vicinity of Vancouver, the supply of fish was found to be very satisfactory and with the present conservation measures there would appear to be no doubt but that good fishing will continue indefinitely.

In the Howe sound and Burrard inlet area the principal commercial streams such as Indian river and the Squamish river received an excellent seeding by pink salmon, this, of course, being the big year. A certain amount of difficulty was experienced for a time owing to an unusually dry season. The supply of chums to these streams was only fair.

In the Capilano, Lynn and Seymour creeks, in spite of the intensive fishing by anglers, the supply of the several varieties, and particularly the steelhead, keeps up in a most satisfactory way. It is remarkable that such excellent fishing can be obtained practically in the city of Vancouver.

The year 1925 was the year of the big pink run to the Fraser river district. The run this year was excellent and all the pink spawning areas were well seeded. Unfortunately the Canadian fishermen obtain a very small proportion of this run owing to the intensive fishing to the south of the international boundary by means of purse-seines and traps. Gill-nets only are permitted on the Canadian side and by the time the fish have run the gauntlet of the Puget sound fishermen few are left for Canadian operators, although the spawning grounds are on the Canadian side.

#### GENERAL

The season 1925 was a most difficult one owing to the lack of rain. The season was the driest for many years and this resulted in there being not sufficient water in the streams for the salmon to pass up to the spawning areas in many cases. In such instances every effort was made by means of increased closed periods, extension of the prohibited areas, and early final closing to the end that a proper proportion of the runs would be enabled to spawn in the usual areas. There have been instances during the year, however, when pinks and chums deposited their eggs close to the salt chuck and it is a question as to whether such spawning will be productive of good results.



1905.....	67	"	"	1,080,673	(28,359 Red & Wh. Springs)	.....	.....	.....	44,458	13,970	.....	1,107,460
1906.....	64	"	"	459,679	31,261	.....	.....	.....	69,132	(68,305 Pks. & Ch.)	.....	629,460
1907.....	58	"	"	314,074	23,159	.....	.....	.....	87,900	(118,704 Pks. & Ch.)	.....	547,459
1908.....	52	"	"	355,023	25,433	.....	.....	.....	81,917	(76,448 Pks. & Ch.)	.....	542,689
1909.....	72	"	"	840,441	18,218	.....	.....	.....	61,918	(46,544 Pks. & Ch.)	.....	967,920
1910.....	58	"	"	565,915	19,313	.....	.....	.....	74,382	34,613	.....	762,201
1911.....	59	"	"	383,509	38,751	.....	.....	.....	119,802	305,247	.....	948,965
1912.....	57	3,640	.....	444,762	62,345	.....	.....	.....	165,309	247,743	.....	996,576
1913.....	78	4,782	.....	972,178	37,433	.....	.....	.....	69,822	192,887	.....	1,353,901
1914.....	63	4,857	.....	536,096	32,908	.....	.....	.....	120,201	220,340	.....	1,111,039
1915.....	63	4,951	.....	476,042	51,734	.....	.....	.....	146,956	367,352	.....	1,133,381
1916.....	72	4,600	.....	214,739	51,231	.....	.....	.....	183,623	280,644	.....	995,065
1917.....	94	5,286	1,370	339,848	48,630	.....	.....	.....	157,589	496,759	.....	1,557,485
1918.....	88	5,073	1,786	276,459	65,535	.....	.....	.....	191,068	527,745	.....	1,616,157
1919.....	82	4,598	2,260	369,445	73,179	.....	.....	.....	175,670	346,639	.....	1,393,156
1920.....	65	4,761	1,855	351,405	95,983	.....	.....	.....	101,972	520,856	.....	1,187,616
1921.....	56	4,777	1,452	163,914	36,725	.....	.....	.....	117,288	192,906	.....	603,548
1922.....	64	4,491	1,513	299,614	21,163	.....	.....	.....	102,845	581,979	.....	1,290,326
1923.....	61	3,957	1,446	334,647	17,539	.....	.....	.....	112,044	440,932	.....	1,341,677
1924.....	62	3,696	1,553	369,601	18,741	.....	.....	.....	115,944	657,561	.....	1,747,505
1925.....	65	4,225	1,821	392,643	39,142	.....	.....	.....	188,505	445,400	.....	1,720,622

NOTE.—Licenses issued 1923, 1924 and 1925 include transfers from one district to another.



[illegible]

NOTE re 1925 figures:—\*Pack of fish caught at Naas River regardless where canned.

†Pack at Naas River regardless where caught.

## PACK OF CANNED SALMON ON THE SKEENA RIVER—1876 TO 1925

STATEMENT No 3

Year	Num- ber of can- neries oper- ated	Number of salmon licenses issued				Sockeye	Red Spring	Pink Spring	White Spring	Blue- backs	Steel- heads	Cohoos	Pinks	Chums	Total
		G.N. Troll.	P.S.	D.S.	T.N.										
1876.....	1	.....	.....	.....	.....	Particulars of varieties not available—practically all sockeye.	“	“	“	“	“	.....	.....	.....	3,000
1877.....	2	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	8,500
1878.....	2	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	10,603
1879.....	2	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	19,694
1880.....	2	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	21,560
1881.....	2	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	24,522
1882.....	5	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	31,157
1883.....	5	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	53,986
1884.....	5	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	12,900
1885.....	2	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	37,587
1886.....	3	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	58,592
1887.....	5	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	70,106
1888.....	5	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	58,165
1889.....	6	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	90,509
1890.....	7	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	78,135
1891.....	7	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	90,280
1892.....	8	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	59,675
1893.....	7	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	61,151
1894.....	7	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	67,797
1895.....	7	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	100,140
1896.....	8	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	65,905
1897.....	8	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	81,234
1898.....	6	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	108,026
1899.....	7	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	128,529
1900.....	10	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	126,092
1901.....	11	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	154,875
1902.....	10	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	98,669
1903.....	10	.....	.....	.....	.....	“	“	“	“	“	“	.....	.....	.....	154,869
1904.....	11	.....	.....	.....	.....	93,404	(20,621	Red & Wh. Spr.)	.....	.....	.....	10,315	30,529	.....	114,085
1905.....	12	.....	.....	.....	.....	84,717	(14,598	Red & Wh. Spr.)	.....	.....	.....	7,247	7,523	.....	162,420
1906.....	14	.....	.....	.....	.....	86,394	20,138	.....	.....	.....	.....	16,867	(38,991	Pk. & Ch	*159,255
1907.....	13	.....	.....	.....	.....	108,413	10,378	.....	.....	.....	.....	15,247	(25,217	Pk. & Ch.)	209,177
1908.....	13	.....	.....	.....	.....	139,846	13,374	.....	.....	.....	.....	10,075	(45,404	Pk. & Ch.)	



PACK OF CANNED SALMON FROM FISH CAUGHT AT RIVERS INLET AND SMITHS INLET, 1881 TO 1925  
STATEMENT No. 4.

Year	Number of canneries operated	Number of salmon licenses issued				Sock-eye	Red Spring	Pink Spring	White Spring	Blue-backs	Steel-heads	Cohoos	Pinks	Chums	Varieties other than sockeye packed at Smiths Inlet	Totals
		G.N.	Troll.	P.S.	D.S.	T.N.										
1881																
1882	1															5,635
1883	1															10,780
1884	2															20,383
1885																
1886	1															15,000
1887	2															11,203
1888	2															20,000
1889	2															25,704
1890	2															32,961
1891	2															34,924
1892	2															15,126
1893	2															35,266
1894	2															39,351
1895	3															58,579
1896	4															107,468
1897	6															40,207
1898	6															104,711
1899	6															71,079
1900	6															75,413
1901	6															66,840
1902	6															75,498
1903	5															75,530
1904	5															101,972
1905	6															91,064
1906	8															132,878
1907	8															105,564

Particulars of varieties not available—practically all sockeye

Particulars of varieties not available—practically all sockeye

74,019 Other varieties.  
Particulars of varieties not available—practically all sockeye

101,542 (11 Red &amp; Wh. Spr. 351 Red &amp; Wh. Spr.)

90,713 (351 Red &amp; Wh. Spr.)

132,631 (181 Red &amp; Wh. Spr.)

97,874 (750 Red &amp; Wh. Spr.)

61

15,460

45,769

102,333

11,123

2,280

66

6,240 (700 Pk. &amp; Ch.)

15,500

12,150

12,150

1908	8	74,452	1,254	9,505	(4,679 k. & Ch.)	89,890
1909	8	102,527	1,087	1,400	(300 Pk. & Ch.)	105,314
1910	8	141,921	383	2,075	19	144,398
1911	8	105,763	1,317	8,287	6,411	127,066
1912	8	129,217	1,452	11,095	5,288	158,798
1913	8	79,345	1,589	3,708	2,015	90,944
1914	*7	89,890	566	7,789	5,784	109,052
1915	8	162,651	1,022	7,115	2,964	292 179,431
1916	9	58,192	1,033	15,314	5,387	13,990 112,629
1917	10	75,326	715	9,124	3,567	18,101 113,758
1918	10	68,447	957	12,074	8,065	4,325 128,937
1918	10	66,842	957	12,074	29,542	10,736 127,332
1919	11	73,754	967	9,038	6,739	13,053 110,736
1919	11	72,072	967	9,038	6,538	13,053 109,234
1920	10	142,793	1,537	2,922	7,059	174,938
1920	10	135,245	1,537	2,922	1,226	165,390
1921	10	50,849	386	4,055	28,189	58,562
1921	10	48,729	406	4,784	3,055	60,569
1922	10	68,818	216	1,145	5,356	94,990
1922	10	66,518	216	1,145	24,311	92,690
1923	10	118,502	230	1,526	21,311	133,930
1923	10	112,350	230	1,526	10,057	127,778
1924	10	91,764	215	1,886	10,057	114,318
1924	10	201,186	344	1,886	15,103	226,030
1925	11	170,581	215	4,887	7,075	196,132
†1925				4,866	8,025	

NOTE.—Figures shown in black are packs from fish caught at Rivers Inlet or Smiths Inlet. Figures in black for years previous to 1918 are actual packs. Figures shown in *italic*, 1918 to 1924, are actual packs irrespective of where fish taken and not including fish shipped out for canning in other districts.

\*1914 figures include Rivers Inlet pack only, no figures being available for Smiths Inlet for that year.

NOTE.—Re column "Varieties other than sockeye packed at Smiths Inlet." For the years this column is utilized, figures of the different varieties other than sockeye packed at Smiths Inlet were not available, and had to be shown as a total. Sockeye for these years are shown under their proper heading.

NOTE.—Licenses issued 1923, 1924 and 1925 include transfers from other districts.

NOTE re 1925 figures.—†Pack of fish caught Rivers Inlet and Smiths Inlet regardless where canned. ‡Pack at Rivers Inlet and Smiths Inlet regardless where caught.

## PACK OF CANNED SALMON IN THE FRASER RIVER DISTRICT—1876 TO 1925

STATEMENT No. 5

Year	Num- ber of can- neries oper- ated	Number of salmon licenses issued					Sockeye	Red Spring	Pink Spring	White Spring	Blue- backs	Steel- heads	Cohoos	Pinks	Chums	Totals	
		G.N.	Troll	P.S.	D.S.	T.N.											
1876	3	Particulars not available.					Particulars of varieties not available—practically all sockeye.										9,847
1877	5	" " " " " "					" " " " " "										64,387
1878	8	" " " " " "					" " " " " "										105,101
1879	7	" " " " " "					" " " " " "										50,490
1880	7	" " " " " "					" " " " " "										42,155
1881	8	" " " " " "					" " " " " "										142,516
1882	11	" " " " " "					" " " " " "										199,104
1883	13	" " " " " "					" " " " " "										109,701
1884	6	" " " " " "					" " " " " "										38,437
1885	6	" " " " " "					" " " " " "										89,617
1886	11	" " " " " "					" " " " " "										99,177
1887	12	" " " " " "					" " " " " "										130,088
1888	12	" " " " " "					" " " " " "										76,616
1889	16	" " " " " "					" " " " " "										303,875
1890	16	" " " " " "					" " " " " "										241,889
1891	11	" " " " " "					" " " " " "										178,954
1892	11	" " " " " "					" " " " " "										79,715
1893	21	" " " " " "					" " " " " "										457,797
1894	20	" " " " " "					" " " " " "										363,967
1895	21	" " " " " "					" " " " " "										400,368
1896	29	" " " " " "					" " " " " "										356,984
1897	35	" " " " " "					" " " " " "										800,459
1898	35	" " " " " "					" " " " " "										256,101
1899	41	" " " " " "					" " " " " "										510,383
1900	48	" " " " " "					" " " " " "										316,522
1901	49	3,832	Particulars not available				"	"	"	"	"	"	"	"	"	990,313	
1902	42	2,685	"				"	"	"	"	"	"	"	"	"	327,095	
1903	35	3,101	"				293,477	Other Varieties:							33,618	4,504	237,125
1904	23	2,224	"				204,809	(2,084: Red and White Spring)								1,066	128,903
							72,088	(9,482: Red and White Spring)									

1903.....	38	2,770.....	"	"	837,489	(5,507: Red and White Spring)	.....	30,836	3,304.....	877,136
1906.....	24	1,746.....	"	"	183,007	6,503.....	1,020	34,413	(15,543 Pk.&Ch.)	240,486
1907.....	18	1,726.....	"	"	59,815	3,448.....	557	35,766	(63,530 Pk.&Ch.)	163,116
1908.....	16	1,374.....	"	"	63,126	1,427.....	18	24,198	(415 Pk.&Ch.)	89,184
1909.....	38	2,688.....	"	"	542,248	1,428.....	.....	21,540	(1,987 Pk.&Ch.)	567,203
1910.....	21	1,577.....	"	"	133,045	1,018.....	8,925	27,855	128	223,148
1911.....	15	1,396.....	"	"	58,487	7,028.....	6,751	39,740	47,237	301,344
1912.....	15	1,430.....	.....	.....	108,784	14,655.....	8,373	38,574	142,101	173,921
1913.....	35	2,560.....	.....	.....	684,506	3,573.....	49	11,648	574	732,059
1914.....	20	2,656.....	.....	.....	185,483	9,485.....	14,000	38,639	9,973	328,390
1915.....	22	2,616.....	.....	.....	89,040	15,388.....	3,532	34,114	6,057	289,119
1916.....	21	2,240.....	.....	.....	27,394	11,096.....	9,217	24,580	128,555	106,440
1917.....	29	2,626.....	.....	.....	123,614	10,197.....	18,916	25,895	840	377,988
1918.....	18	1,582.....	.....	.....	16,849	15,192.....	24,274	40,111	134,442	377,988
1919.....	14	1,337.....	.....	.....	29,628	14,519.....	579	3,760	18,388	206,003
1920.....	11	1,288.....	.....	.....	44,598	19,961.....	704	15,613	39,363	158,718
1921.....	13	1,437.....	.....	.....	35,900	11,360.....	2,188	4,488	12,839	132,860
1922.....	10	1,296.....	.....	.....	48,744	10,561.....	467	1,323	8,178	103,917
1923.....	11	964.....	.....	.....	29,423	3,854.....	2,433	812	29,578	137,482
1924.....	9	969.....	.....	.....	36,200	2,982.....	664	3,615	63,645	224,637
1925.....	10	969.....	.....	.....	31,523	7,335.....	592	1,767	31,968	209,050
			.....	.....	.....	873	25,482	5,107	99,800	272,993

NOTE.—Licenses issued 1923, 1924 and 1925 include transfers from other districts.

## MARINE AND FISHERIES

STATEMENT No. 6

## PACK OF CANNED SALMON OF PUGET SOUND FROM 1887 TO 1925

Year	Number of canneries operated	Spring	Sockeye	Cohoe	Chum	Pink	Steel- head	Total
1887.....		Particulars of varieties not available.						22,000
1888.....	4	"	"	"	"	"	"	21,975
1889.....	2	240		7,480	1,145	2,890		11,674
1890.....	1	1,000		3,000	4,000			8,000
1891.....	2	382	5,538	5,869	3,093	5,647		20,529
1892.....	2	86	2,954	7,206	16,180			26,426
1893.....	3	1,200	47,852	11,812	11,380	17,530		89,331
1894.....	3		41,781	22,418	22,152	9,049		95,400
1895.....	7	1,542	65,143	50,865	38,785	23,633		179,968
1896.....	11	13,495	72,979	82,640	26,550			195,664
1897.....	12	9,500	312,048	91,900	23,310	57,268		494,026
1898.....	18	11,200	252,000	98,600	38,400			400,200
1899.....	19	24,364	499,646	101,387	31,481	252,733		919,611
1900.....	19	22,350	229,800	128,200	89,100			469,450
1901.....		Particulars of varieties not available.						1,380,590
1902.....	21	30,049	372,301	85,817	93,492			581,659
1903.....	22	14,500	167,211	103,450	12,001	181,236		478,488
1904.....	13	14,441	109,264	118,127	49,656			291,488
1905.....	24	1,804	825,453	79,335	41,057	70,992		1,018,641
1906.....	16	8,139	178,748	94,947	149,218			430,602
1907.....	14	1,814	93,122	119,372	50,249	433,423		698,080
1908.....	22	95,210	170,951	128,922	47,607	6,075		448,765
1909.....	11	13,019	1,097,904	143,133	53,688	370,993		1,632,949
1910.....	24	10,064	248,014	162,755	146,942	108		567,883
1911.....	15	21,823	127,761	256,124	104,321	1,046,992		1,557,029
1912.....	20	20,252	184,680	149,727	60,760	700		416,125
1913.....	22	1,234	1,673,099	61,019	56,225	791,886		2,583,463
1914.....	31	26,044	335,230	151,893	278,801	892		792,860
1915.....	41	28,466	64,548	180,783	411,724	583,649		1,269,206
1916.....	32	37,030	84,637	155,832	427,878	1,887		707,278
1917.....	45	57,543	411,538	114,276	216,285	1,124,884		1,921,554
1918.....	32	63,366	50,723	235,860	267,538	6,605	106	624,198
1919.....	35	68,542	64,346	210,883	525,541	421,215	5,076	1,295,626
1920.....	11	25,846	62,654	24,502	48,849	4,669		166,520
1921.....	23	25,567	102,967	89,412	30,831	404,713		653,490
1922.....	16	20,615	48,566	111,711	65,552	2,225		248,729
1923.....	18	15,777	47,402	122,000	97,081	475,849	29	758,138
1924.....	12	19,968	69,369	87,879	134,360	5,945	128	317,649
1925.....	23	28,268	106,064	171,587	41,635	555,848	141	903,543

STATEMENT No. 7

## STATEMENT OF HALIBUT LANDINGS—BRITISH COLUMBIA, 1913 TO 1925

	Cwts.
1913.....	223,465
1914.....	214,444
1915.....	194,896
1916.....	123,062
1917.....	113,529
1918.....	186,229
1919.....	210,777
1920.....	238,770
1921.....	325,868
1922.....	293,184
1923.....	334,667
1924.....	331,382
1925.....	318,240

## STATEMENT OF DRY SALT HERRING PACKS, 1918 TO 1925

## STATEMENT No. 8

Year	District No. 1	District No. 2	District No. 3		Total
			East Coast	West Coast	
	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
1918.....	20,000	Nil	109,900	42,710	172,610
1919.....	4,000	Nil	43,000	208,058	255,058
1920.....	807	1	176,640	334,720	512,168
1921.....	249	Nil	231,240	248,482	479,971
1922.....	Nil	Nil	297,871	224,897	522,768
1923.....	Nil	8,935	250,420	484,681	744,036
1924.....	Nil	Nil	305,266	548,277	853,543
1925.....	Nil	4,120	487,892	591,162	1,083,174

## STATEMENT No. 9

STATEMENT OF WHALES LANDED AT WHALING ESTABLISHMENTS IN  
BRITISH COLUMBIA DURING 1925

Species	Kyuquot Plant	Rose Harbour Plant	Naden Harbour Plant	Total
Sperm.....	3	51	22	76
Fin.....	35	57	43	135
Hump.....	8	23	9	40
Sei.....	35	30	3	68
Sulphur.....		13	16	29
Bottlenose.....	1	2		3
Totals.....	82	176	93	351

STATEMENT SHOWING INCREASE OR DECREASE IN LICENSES ISSUED IN 1925 OVER LICENSES ISSUED IN 1921 AND 1922,  
BRITISH COLUMBIA

STATEMENT No. 10.

Variety of License	Area	Licenses issued, 1925				Increase over 1922				Decrease from 1922			Totals all kinds	
		Whites	Indians	Japs.	Total	Whites	Indians	Japs.		Whites	Indians	Japs.	Net increase	Net decrease
Salmon gill-net.....	Whole province..... Percentage.....	1,963	1,247	1,015	4,225	493	215					974		266
"	District No. 1..... Percentage.....	485	39	445	969	95	5					427		5.9
"	District No. 2— Naas River..... Percentage.....	12	117	81	210		3			20		77		327
"	Skeena River..... Percentage.....	339	401	327	1,067	180	111			62.5		48.7		25.2
"	Rivers Inlet..... and Smiths Inlet..... Percentage.....	643	403	81	1,127	76					64	76		94
"	Outlying..... Percentage.....	278	128	56	462	13.4					13.7	48.4		30.9
"	Total District No. 2..... Percentage.....	1,272	1,049	545	2,866	43	49					55	37	24
"	District No. 3..... Percentage.....	206	159	25	390	18.3	62.0					49.5	8.7	2.2
						279	99					523		64
						28.1	10.4					48.9		5.4
						119	111					24	206	
						136.8	231.3					48.9	111.9	
Boat.....	Whole province..... Percentage.....	123	12	82	217	46	6					83		31
Buyers.....	Whole province..... Percentage.....	41		20	61	59.7	100.0			44		50.3		12.5
										51.8		21		65
												51.2		51.6

Salmon trolling.....	1,091	539	191	1,821	482	200	313	369
Percentage.....					79.1	58.9	62.1	25.4
District No. 1.....	50			50	26			25
Percentage.....					108.3		100.0	100.0
District No. 2.....	328	182		510	104	49	5	148
Percentage.....					46.4	36.9	100.0	40.9
District No. 3—								
East Coast.....	503	103	80	686	265	38	113	190
Percentage.....					111.3	58.4	58.5	38.3
West Coast.....	210	254	111	575	87	114	195	6
Percentage.....					70.7	81.4	63.7	1.1
Total District No. 3.	713	357	191	1,261	352	152	308	196
Percentage.....					97.5	74.1	61.7	18.4

STATEMENT SHOWING THE NUMBER OF SALMON GILL-NET LICENSES,  
DISTRICT NO. 2 USING POWER BOATS

STATEMENT NO. 11.

Division	White	Indian	Japanese	Total
Naas.....	1	8		9
Skeneva.....	48	16		64
Central.....	1	7		8
Bella Coola.....	9	3		12
Rivres Inlet.....	95	9	6	110
Smiths Inlet.....	38	1		39
Total.....	192	44	6	242

Note.—Four of the licensees with power boats fished at both Rivers Inlet and at the Central Division.

SUMMARY—BRITISH COLUMBIA—COMPARATIVE STATEMENT OF LICENSES ISSUED, SEASON 1922-1925, AS AT DECEMBER 31, 1925  
STATEMENT No. 12.

	Season 1922						Season 1924						Season 1925					
	Whites			Indians			Whites			Indians			Whites			Indians		
	Issued	Issued	Total	Issued	Trans.	Issued	Issued	Trans.	Totals	Issued	Trans.	Totals	Issued	Trans.	Totals	Issued	Trans.	Totals
Salmon Cannery.....	64		64			61			61			61	67		67			67
Salmon Drag-seine.....	36		36			31			31			31	28		28			28
Salmon Curing.....	52		52			44			44			44	62		62			62
Salmon Gillnet.....	1,470	1,032	2,502	1,032	1,989	1,468	187	1,094	27	1,193	3,755	214	1,335	108	1,443	1,196	52	3,887
Salmon Purse-seine.....	143		143			192	29	2	1	194	29	1	227	15	242	27	60	302
Salmon Trapnet.....	4		4			6			6			6	19		19			19
Salmon Trolling.....	743	488	1,231	488	332	698	1	499	249	1,446	1	773	3	552	1,550	3	83	1,803
Boat (Buyers).....	77	6	83	6		84		8	25	188		88	12		201	12		213
Buyers.....	85		85			168		8	25	201		51	41		76	41		117
Assistant Salmon Seine.....						343		539	881	322	9	656	521		948	521		1,469
Captain Salmon Seine.....	49	52	101	52	38	28	30	30	132	58	2	192	75		174	75		249
Assistant Salmon Gillnet.....						121		343	528	992		149	1	323	1,007	1	373	1,380
Experimental Salmon Cannery.....	2		2															1,083
Pilchard and Herring Cannery.....	2		2			4			4			3			3			3
Herring Curing.....	12		12			23			29	6		3			27			30
Herring Drag-seine.....						3			3									1
Herring Gillnet.....	19		19			21			32			11			40			51
Herring Purse-seine.....	24		24			37			40			3			49			52
Captain Herring Seine.....	1		1			15		7	9	31		22			37			45
Abalone Cannery.....	1		1									1			1			1
Abalone Fishery.....	2		2															1
Cod and Rock Cod Gillnet.....	34	1	35			24			62	86		25			62			87
Cod Hook and Line.....						66		8	304	378		115			313			313
Crab Fishery.....	88	5	93			102		19	3	124		122			126			126
Grayfish Gillnet.....	31		31			15			25	40		12			30			30
Grayfish Hook and Line.....						11		3	33	47		42			101			143
Miscellaneous Cannery.....																		1
Reduction Works.....	4		4			4						7			7			7
Shellfish Cannery.....	9		9			12			12			10			10			20
Smelt Drag-seine.....	13		13			17		1	5	23		19			27			27
Smelt Gillnet.....	6		6			33			16	27		8			24			24
Smelt Purse-seine.....	2		2			2			2	6		6			6			6
Sturgeon.....						2		2										1
Whale Cannery.....	2		2			3				3								3
Whale Factory.....																		
Grayfish Drag-seine.....	1		1															
Grayfish Purse-seine.....	1		1			1												
Grayfish Weir.....	1		1															
Groundfish Drag-seine.....	10	2	12			6			1	7		14			16			20



## APPENDIX 2

## REPORT ON ACTIVITIES OF MARINE BIOLOGICAL BOARD FOR 1925

By J. J. COWIE, *Secretary-Treasurer*

The board is charged with the control of the various Biological stations and the investigations undertaken thereat. It meets once a year at Ottawa, and at such places and times as may be found absolutely necessary for the carrying on of the work of the board.

A committee called the Executive Committee is charged with the supervision and carrying out of the undertakings involved in the policies formulated by the board. A sub-executive on the Atlantic, and another on the Pacific coast, has immediate supervision, under the executive committee, of the local activities of the board's staff of workers at the stations.

## BIOLOGICAL STATION AT ST. ANDREWS, N.B.

The Station at St. Andrews, N.B., provided accommodation or field facilities during the season of 1925 for twenty-seven investigators, who continued their investigations during the following winter at their respective universities. There were from the various universities the following numbers of investigators: Western (London), three; Toronto, eight; Queen's (Kingston), four; Montreal, one; McGill (Montreal), four; New Brunswick (Fredericton), two; St. Francis Xavier (Antigonish), one; Dalhousie (Halifax), three; and Manchester (England), one.

The subjects investigated were as follows: abnormal development of fish eggs, lethal temperatures of various organs in fishes, algae of Passamaquoddy bay, factors for diatom maxima, life history of cod, ecology of periwinkle, effect of light on marine crustacea, lethal temperatures for molluscs, culture of entomostraca, temperature needs for oyster development, chemistry of haddock muscle, effect of light on growth of algae, temperature and salinity needs for mackerel development, biological interpretation of fisheries statistics, rigor mortis of fish muscle, digestion in Cladocera, lactic acid in fish muscle, blood sugar levels in certain fishes, physiology of the spleen and other organs in fishes, temperature behaviour of connective tissue of fishes, hydrography of Halifax and St. Andrews regions, copepods in the food cycle of the sea, life-history of the shad, physical requirements of the shipworm (in co-operation with National Research Council), character of Mackerel schools. A survey was made of the Caraquet oyster-beds, and a general biological survey of Halifax harbour, including Bedford basin. A start was made with the program for the tagging of cod, haddock, and mackerel. Certain laboratory facilities were provided for collectors of the Royal Ontario Museum of Zoology, and laboratory accommodation and facilities were provided for Dr. L. H. Almy of the U.S. Bureau of Chemistry for an investigation of the "rotting" of "feedy" sardines. The U.S. Bureau of Fisheries gave Dr. A. H. Leim, Assistant Director of Atlantic Biological Station, facilities at Gloucester, Massachusetts, for a study of the physical needs for the development of cod, haddock and pollock.

The following is a list of the Investigators who worked at the station, and the problems tackled by each:—

Miss H. I. Battle, Western University: Abnormal development of eggs; comparative lethal temperatures of fish tissues.

H. P. Bell, Dalhousie University: Distribution of Algae.

Miss V. M. Davidson, Toronto University: Medusae in relation to Diatom Production.

G. L. Duff, Toronto University: Life History of Cod.

A. H. Gee, Toronto University: Journalistic Articles on Work of Stations.

J. H. Harvey, Toronto University: Effect of Sunlight on Marine Animals.

R. V. Hayes, Dalhousie University: Ecological Relationships of Periwinkles.

Miss J. T. Henderson, McGill University: Comparative lethal temperatures of Bivalve Mollusks.

A. B. Klugh, Queen's University: Culture of Cladocera and experiments in measuring light.

T. Kurata, Royal Ontario Museum: Preparation of Museum Material.

L. J. Laporte, Montreal University: Oyster Studies.

A. H. Leim: Investigation of Chamcook Lake.

F. J. Logan, McGill University: The Proteins of Fish Muscle.

S. G. Logier, Royal Ontario Museum: Preparation of Museum Material.

J. R. Martin, Queen's University: Light Intensity and the Growth of Algae.

R. H. M'Gonigle, Toronto University: Limiting Factors for Larvae of Bivalve Molluscs.

Miss J. R. Pantem, Toronto University: Rigor Mortis of Fish Muscle.

G. R. Rankin, Queen's University: Physiology of Cladocera.

A. D. Ritchie, Manchester University: Lactic Acid in Fish Muscle.

W. W. Simpson, Toronto University: Blood Sugar in Fishes in Relation to the Action of Insulin.

J. Tait, McGill University: Heat Contraction of Fish Connective Tissue, Structure and Function of Fish Spleen.

#### EXPERIMENTAL STATION AT HALIFAX

The Atlantic Experimental Station for Fisheries was established at Halifax, N.S., in the spring of 1925, on a portion of the King's wharf, made available by the Department of Militia and Defence. Old buildings were converted for the purpose of the station so as to furnish experiment, work and demonstration rooms, biochemical, bacteriological, and special laboratories, library, offices, and board room in the main building, and a smoke-house in one of the out-buildings. Committees were formed of men in the fishing industry and of representatives of Dalhousie University and the Nova Scotia Technical College as follows: a general advisory committee, a committee on the smoking of fish, a committee on fish refrigeration.

On the educational side there have been the following: Publication of a bulletin on the prevention of blackening in lobster canning. Preparation of bulletins on the processing of dried fish and on the smoking of fish. Addresses by the Director in Halifax, Moncton, Yarmouth, Lunenburg, Liverpool, and Canso. Answering of queries concerning methods of fish curing. Collection of data on present methods in the fishing industry. Public exhibit in Halifax of foreign and domestic cures of dried fish. Scientific and practical course for hatchery officers held at Truro, N.S., under the Chairman of the Board as Acting Educator.

Technical service was furnished the industry in the following directions: effect of icing on subsequent drying of fish, comparative deliquescence of various grades of salt; analyses of fish meal.

On the experimental side the station was asked by the General Advisory Committee to take up the subject of the smoking of fish. Six experienced investigators were employed during the summer of 1925 and two of these were continued during the following winter season. In addition to general experimentation in smoking, special attempts were made to ascertain the scientific principles on which the successful preparation of smoked fish under varying

local or atmospheric conditions could be based. In this connection the following reports have been prepared.

Experiments on the production and the chemistry of wood smoke, in connection with the fish smoking industry, by J. A. Dauphinee, M.A.

Investigation into the tensile strength of fish muscle before and after treatment, by J. C. Forbes, Ph.D.

Effect of smoke on the tensile strength of fish muscle, by J. C. Forbes and J. A. Dauphinee.

Influence of smoke and its constituents on the bacteria in the smoke-curing of fish, by Ernest Hess, M.A.

The Micro-organisms responsible for the spoiling of fish muscle, by A. H. Gee, M.A., Ph.D.

Protein changes in pickled and smoked fish, by N. B. Dreyer, B.A.

Other reports are in preparation.

These investigations have among other things brought out the following. The sheen desired in smoked fish is an extreme example of case hardening through rapid surface drying, a thin skin about one-four-hundredths of an inch in thickness being formed. The drying cannot be too rapid for this. Early smoking affects unfavourably the smoothing of the surface of the skin, and late smoking ensures its permanence. The strength of the fish to stand handling and to keep from dropping when hung is improved by brining, by drying, and by the application of smoke. Weak acid emphasizes the action of brining, but, when alone, acid is objectionable in this regard. The substance in smoke, that is important for strengthening the fish is formaldehyde. Both brining and smoking give the final product longer life, that is better keeping qualities. This is through the disinfectant action of the salt and certain constituents of the smoke on the bacteria of spoilage. This disinfectant action is continued for a time after the fish are removed from the smoke. The principle substance in the smoke for disinfectant action is formaldehyde. The yellow or amber colour of the smoked fish is due to an oxidation-product of pyrogallol, which is present in the smoke. Smoke from wood heated away from air is very ineffective in colouring the fish. The colour is enhanced by previous treatment of the surface of the fish with a weak alkali by the presence of formaldehyde, and by exposure of the fish to air for some hours subsequently to smoking. Formaldehyde applied in the form of vapour acts on the fish, so as to give, after cooking, a definite and agreeable flavour. Smoke from wood heated away from air gives a distinctly disagreeable flavour to the fish. Increase in the amount of air reaching the heated wood results in a decrease in the amount of acetic acid and an increase in the amount of formaldehyde in the smoke.

Experiments in the development of an economical commercial quick freezer for fish have been continued. These have demonstrated that a comparatively cheap and very effective apparatus for brine-freezing fish can be connected up satisfactorily with the brine-system of an ammonia refrigerating plant. In previous experiments an efficient salt and ice apparatus had been developed.

The station has been in receipt of considerable assistance and courtesy from various men and firms in the fishing industry, and from Dalhousie University and the Nova Scotia Technical College, as well as from various members of their staffs.

#### BIOLOGICAL STATION AT NANAIMO, B.C.

Special attention was given to the collection and naming of all marine animals and plants of the coast and studies of their life histories, distribution, etc. This information must form the basis of experimental and economic work. Drs. O'Donoghue, University of Manitoba, and Fraser, University of British Columbia, have carried this work forward as well as Mrs. Berkeley, Messrs. Wailes, Cornwall and Fee.

Work in marine bacteriology has been commenced by Mr. Berkeley.

Biochemical studies of fish, clams and crabs have been carried on by Dr. Collip, University of Alberta, and his assistant Dr. Clark.

Studies of the anatomy of fish and other forms have been made by Dr. O'Donoghue, Dr. Craigie, Mr. Bolton and Miss Mather.

Scale studies of sockeye salmon have been carried out by Dr. Clemens, partly in association with the Department of Fisheries of British Columbia.

A comprehensive study of the life-history of the ling cod and the economic phases of the fishery is being conducted by Mr. Wilby of the University of British Columbia.

A considerable amount of data is being collected relating to the life histories of herring and salmon.

A continuous record of temperatures, specific gravities and hydrogen-ion concentrations is being obtained at Departure bay and of temperatures at William head, near Victoria. (It is planned to commence extensive oceanographical studies this year. This will include the collection of temperature records, salinities, etc., along the coast and quantitative samples of plankton microscopic plants and animals.) All this information is necessary in studies of fish distribution and movements and in connection with problems connected with the propagation and conservation of such animals as crabs, oysters and clams.

The Biological Board is co-operating with the international Fisheries Commission which is studying the problem of the conservation of the Pacific halibut.

The board is also taking an active part in the international Pacific Salmon Investigation Federation which has as one of its main objects the co-ordination of scientific studies of the various species of Pacific salmon.

#### LIST OF WORKERS

Mrs. C. Berkeley, Nanaimo: Systematic and distributional study of polychaete worms.

Miss Alfreda Berkeley, Nanaimo: Systematic and distributional study of Ophiurans.

Mr. L. L. Bolton, University of Toronto: Anatomy of the digestive tracts of fish.

Dr. E. P. Clark, University of Alberta: Calcium metabolism in various species of fish, crabs and mollusks.

Dr. J. B. Collip, University of Alberta: Calcium metabolism in various species of fish, crabs and mollusks.

Rev. Robert Connell, Victoria: Systematic and distributional study of sea weeds.

Dr. E. H. Craigie, University of Toronto: The vascularity of the brain of the dogfish and the sex ratios among fish.

Dr. Francis E. Lloyd, McGill University: Fluorescence in algae.

Miss Vera Mather, University of B.C.: Comparative study of the endostyle and thyroid in Ascidia and lampreys and a study of the musculature of the branchial apparatus of lampreys.

Dr. C. H. O'Donoghue, University of Manitoba: Systematic and distributional studies of mudibranchs, Bryozoa and crabs.

Mrs. C. H. O'Donoghue, Winnipeg: Systematic and developmental studies of Bryozoa and a systematic study of crabs.

Mr. G. Van Wilby, University of B.C.: Life-history of the ling cod and economic aspects of the ling cod fishery.

## EXPERIMENTAL STATION, PRINCE RUPERT, B.C.

*Fish Refrigeration.*—Mr. D. B. Finn, B.Sc., in charge. Carried out researches on Atlantic coast for about four months. Visited refrigeration plants on Atlantic coast, Montreal, Port Dover, Winnipeg and Vancouver. Has established temporary quarters at Prince Rupert, pending erection of station building and will carry out experimental work in plant at Canadian Fish and Cold Storage Company, at Prince Rupert. Mr. Roger Reid, B.Sc., assistant in fish refrigeration, has prepared bibliography on refrigeration.

*Fish Oils.*—Mr. H. Brocklesby, University of Manitoba, has been studying fish oils, especially that of dogfish livers and will spend next summer on Pacific coast.

*Salmon Movements.*—Dr. H. C. Williamson in charge. Tagged spring salmon during period of six weeks off west coast of Vancouver island. Results showed southerly movement of these fish to Fraser river, Puget sound, Columbia river and a few to Sacramento river, California.

Tagged spring salmon off west coast of Queen Charlotte islands over period of about four weeks. Result showed generally southerly movement to Fraser river, Puget sound and Columbia river, but a few went eastward to the Skeena. Tagged sockeye salmon at Wales Island near Alaskan-Canadian boundary. Results showed majority of these fish went to Naas river, some southward into Skeena river and some northward into Alaskan waters. Tagged sockeye salmon near Seymour Narrows east coast of Vancouver island. Results showed that practically all these fish went to the Fraser river and thus definitely established that a portion of the Fraser river run comes in from the sea around the north end of Vancouver island.

Dr. Williamson will continue the salmon tagging work next year and will tag throughout the fishing season on the west coast of Vancouver island.

*Sockeye Salmon Races.*—Dr. Williamson has been making a special detailed study of the races of sockeye salmon occurring in the Fraser river.

Next summer it is planned to carry out special studies of clams, crabs and oysters on Pacific coast.

## FISH CULTURAL INVESTIGATIONS

In view of the doubts publicly expressed as to whether the results from artificial fish culture were such as to justify the expenditures being made on that service, the department in the end of the year 1924 asked the board for some authoritative opinion thereon. The board at a special meeting carefully considered the matter and came to the conclusion that there is at the present time insufficient knowledge to enable it to say that the present fish cultural work of the department is or is not justified by economic results; that a thorough scientific investigation be immediately commenced covering a period of years to furnish the basis of knowledge for economically successful artificial fish propagation; that pending these investigations the Department give more attention to assisting the natural propagation, and that the existing hatcheries be maintained so far as in the opinion of the department they may be justified. The board was, therefore, authorized to formulate plans for such investigation and to go ahead with it. Consequently, in the spring of 1925 a Research Committee of the board was formed for this purpose. The Research Committee considered that two courses were open. The first to do away with the present system of artificial propagation and build up a rational practice based strictly upon investigation and experience. The alternative to continue the present system and steadily modify it on the basis of investigation and experience. This

latter course has been adopted, and is to be continued until it shows sufficient promise of success. With this end in view, the Research Committee has in hand intensive investigations at Cultus lake, B.C., which will ultimately determine the results from artificial propagation of sockeye as compared with natural propagation of that species of salmon. With the same end in view, investigations are going on in Eastern Canada with a view to determining the value of the artificial propagation of trout.

In addition to these investigations during 1925, the Research Committee carried on investigations in the Jasper Park lakes and other lakes of the West.

#### COURSES OF INSTRUCTION

During the first half of August, 1925, the board provided a course of instruction for fish hatchery officers of Eastern Canada. The course was held at Truro, N.S., under the direction of Dr. A. P. Knight, Chairman of the Board. Those assisting him were Professor Barteaux, of Truro Agricultural College; Professor Harlow, Truro Agricultural College; Mr. George Jeffers and Mr. H. C. White, employees of the board. Thirteen of the hatchery superintendents attended the course. The principle on which the program of study was made up was the same as that followed in scientific schools and universities, viz., that the teaching of physics and chemistry should precede the teaching of the other natural sciences, because a knowledge of physics and chemistry forms the necessary foundation for a knowledge of the other sciences. Besides elementary physics and chemistry, parts of biology and fish culture were also taught. The biology was limited to a brief outline of the anatomy and physiology of the trout. The fish culture was limited to a study of limnology, or that science which treats of ponds, lakes, brooks and rivers, and the substances for fish and fry which are found in them.

## APPENDIX 3

OBSERVATIONS ON THE AMERICAN LOBSTER (*Homarus Americanus*)By Mr. ANDREW HALKETT, *Naturalist*

Early in the present year Mr. J. J. Cowie recommended that during the lobster fishing season in the portion of the strait of Northumberland where large lobsters known as "jumbos" are brought to the canneries, I should be instructed to investigate into the matter from the viewpoint of the value of those large lobsters as reproducers.

On the strength of his recommendation I was notified to undertake the work, and therefore gave it close and varied attention.

There was no way, however, owing to promiscuous circumstances attending the bringing in of the lobsters to the canneries or in their being passed on to the boilers, for me to pursue a regular systematic course of investigation, and I was, therefore, subject to whatever opportunities presented themselves when visiting the canneries or in seeing lobsters where for the time being they were moored in crates.

Nevertheless by persistently observing whatever was on hand to observe, I ascertained to the satisfaction of my own mind that the taking of those mature and full grown lobsters is a detriment and injury to the welfare of the industry.

In fact I concur in the judgment of intelligent and experienced cannery men that no lobsters over 13 inches should be allowed to be taken. The cannery men, as a rule, do not want large lobsters, let alone so called "jumbos" as they entail loss to the industry. A manager of a cannery told me that the expenses for one season for large lobsters stood 25 per cent. Earlier in the season I saw at Cote Ste. Anne a boiled lobster, 16 inches, 8½ pounds when alive, 8 pounds when boiled, for which the manager paid \$1.06, and which he did not want. The trouble is with the fishermen who are blind to their own interests.

There are fishermen who say that the great big overgrown, covered-with-barnacles, lobsters are males, and in that assertion, if taken by itself, there is a measure of truth in what they say. But such fishermen do not look further nor get anywhere near what is involved in destroying mature, reproducing lobsters, whether males or females, and these valuable lobsters, irrespective of sex, may, on account of their size, well be termed the real reproducers.

The story is therefore not all told when fishermen speak as they do. Well do I know beforehand on hearing that there is a big "jumbo", with enormous claws and all covered with barnacles upon its coarse, rugged shell, to be shown, that I am going to see a male. But these are merely secondary matters, masculine lobster characteristics. But there are corresponding feminine characteristics. A large female lobster is not tempered as coarsely as a male, and does not present as formidable an appearance.

It is perfectly true that there are far more enormous males than there are enormous females, in my recent observations the percentage was about 87½ in the former and about 12½ in the latter in about 60 large lobsters, but as is known from past determinations the percentage of the sexes stands about 50 to 50, so that the large females, although as a rule, not attaining to the huge dimensions of the males are equally as valuable as reproducers.

Something more direct may tend to show this.

I came across a female 18½ inches, 8 pounds, which had a new, still pliable shell. Practically there was little or no meat in this lobster, and its value lay in the eggs that would have been. But this lobster was for the boiler.

Another female, 14½ inches, 4 pounds, showed indications of being ready to extrude her eggs, and had long hairs for the purpose on the swimmerets; and another, 14 inches, 3½ pounds, had a new shell, with only one claw, and there were indications that eggs would soon have been extruded.

Another female 16 inches, 5 pounds, had a new pliable shell and little or no meat.

These instances I produce to show the waste that is going on, and there are many such.

The value of the "jumbo" males lies in the enormous number of sperms which they possess. These were magnified and compared with the sperms of an 8½ inch male and a 10¾ inch male, and the sperms of all three were essentially the same, the vital difference in the "jumbos" being that the number of sperms were, owing to their greater size, enormously greater.

In any sized lobster the sperms under the microscope can be seen in great masses, in plate II, figure 10, I have spread a few of them out so as to convey an idea of their shape and apparent size when magnified 500 diameters.

The investigations were made at Cape Spear, Cape Tormentine, Borden, and Point Traverse.

On the New Brunswick side of the strait Overseer Prescott greatly facilitated my work through having attended to preliminaries against my arrival in his district, and helped me much when I was in it.

On the Prince Edward Island side Inspector Gallant and Overseer Square-briggs facilitated my work greatly. Inspector Gallant was with me during one whole day, when as everything was favourable much information was gained.

I have also to express indebtedness to managers at canneries who courteously gave me every access in examining lobsters, in having them retained for me until examined, and in other respects aided me besides.

There is one question that I can hardly deal with. It concerns the dimensions of the entrance spaces to the traps. Canners seem to be averse to having any change in that respect, and emphasize that a regulation should simply prohibit the bringing in of lobsters of sizes as determined by law. They seem to maintain that a smaller entrance space, to be enforced, might only lead to complications, but they seem to be as a rule desirous to have the large lobsters conserved and that to bring them in should be strictly prohibited.

While at Cape Tormentine I received a telegram from the Department to go to Charlottetown to deliver an address before a Lobster Packers' meeting. The address was given extemporarily as I had no time to prepare a paper, and seemed to be well received.

The maps (represented in blue-prints) and a facsimile of Mr. Watson's graph are by Mr. C. C. Bruce, Chief Engineer of the Fisheries, the tabulations were prepared from my manuscripts under his supervision, and the plates with their figures (represented in blue-prints) are my own.

## APPENDIX 4

REPORT ON FISHWAYS AND REMOVAL OF OBSTRUCTIONS,  
BY CHAS. BRUCE, FISHERIES ENGINEER

The following report furnishes in detail information regarding inspections, construction of fishways and removal of obstructions to the ascent of fish,

## NOVA SCOTIA

1. *Tusket River, Yarmouth Light and Power Company, Limited.*—As intimated in the previous annual report, extensive modifications to the power dam were carried out during the last year, thus rendering the fishway, which had only recently been completed, ineffective. An inspection and survey of requirements for modifying the fishway were made and plans for the completion thereon served on the company.

2. *Salmon River, Yarmouth County.*—

(a) A dam owned by Samuel Durkee, Pleasant Valley, Yarmouth county, was inspected and information secured for the design of a fishway therein.

(b) A dam owned by Parker Eakins & Company was inspected and information secured for the design of a fishway therein.

3. *Clyde River, Shelburne County.*—The fishway constructed in 1924 by the Clyde Pulp Company, Limited, at Queens was inspected and found to be in good order. The diversion of practically the entire discharge of the river through the power canal to the pulp mill at critical periods during the ascent of salmon and sea trout proves the most serious obstacle to the entire success of this fishway.

4. *Broad River, Queens County.*—An inspection of a fishway in a small dam at the mouth of this river was made and suggested alterations to improve the passage for fish discussed with the owner, who agreed to carry out the necessary work. Broad river has a fair run of sea trout entering it, which makes an adequate fishway desirable.

5. *Mersey River, Queens County.*—In view of the fact that there was in prospect extensive development on this river, including the construction of paper and pulp mills, information was sought as to the possible effect of such development on the fisheries.

While nothing definite could be learned owing to the uncertainty at the time as to just what form development of the water-power might take, it seemed reasonably certain that provision for the ascent of salmon could be made.

6. *Medway River, Queens County.*—Owing to the fact that it was very difficult for alewives to ascend the fishway through the pulp mill dam at Salter's Falls, particularly at high water, and that numbers of them were being killed, it was decided to make certain modifications. A survey revealed that it would be impossible to accomplish the desired results by using the existing fishway, owing to excessive grade. It was accordingly necessary to reroute the fishway entirely, the work involving extensive blasting and concrete construction.

As this work was an alteration to an existing fishway, which had been built by the owners of the dam, it was done by the department under subsection 4 of section 31 of the Fisheries Act at a cost of \$505.49.

7. *Branch Brook, Lunenburg County.*—Representations having been made that this brook should be cleared for the passage of alewives, an inspection was

made. The brook was found to be of very little importance and small in volume. As it would have required probably \$300 to make it reasonably passable, in addition to the fact that the owner of the small dam located on it would have to build a fishway, it was not considered advisable to incur any expenditure.

8. *LaHave River, Lunenburg County*.—The two fishways in dams on this river immediately above tide water were inspected and found to be effective. Last year the fishway in the second dam was blocked by the logging operations and notice was served that such would not be permitted in future unless an adequate fishway were provided.

As the main LaHave is obstructed by a falls and two dams below New Germany, the falls being practically insurmountable, it was decided to direct attention to the north branch which enters the main river below these falls. The following obstructions on this branch were inspected and information obtained whereby fishways could be built, viz:—

- (a) Dam owned by Fred DeLong.
- (b) Dam owned by Messrs. Rhuben Keddy, Wm. Caldwell, Daniel Veniot, Rufus Feindel and Amos Ernst.
- (c) Indian Falls, a natural falls the total height of which is about 20 feet.
- (d) Dam owned by Hulbert Millbury.

9. *East River, Lunenburg County*.—Falls or rapids on this river which prevented ascent of salmon, except during high water, were inspected. Work which included blasting to confine the flow of water into a narrow defined channel was done at a cost of \$115.51.

The fishway in the Chester Light and Power Company's dam on this river was inspected and directions given the manager for certain modifications to make it more effective.

10. *Martin River, Lunenburg County*.—Obstructions to the ascent of salmon into lake Spondo were removed, including the improvement of the channel at the site of an old dam at a cost of \$188.16.

11. *Benery Brook, Halifax County*.—Obstructions consisting of jams of logs and debris were removed at a cost of \$50.

12. *Sackville River, Halifax County*.—Improvements of the passage for salmon through an old abandoned dam were made at a cost of \$5.

13. *White Lake, Halifax County*.—Arrangements were made to build a fishway in the dam at the outlet of this lake, but owing to high water the work was not completed.

14. *Gays River, Halifax County*.—Investigation of the necessity for a fishway in Cook's dam on this river was continued. Evidence so far obtained indicates that no good purpose would be served by requiring its construction.

15. *Tangier River, Halifax County*.—Repairs to the fishway in the Tangier Gold Mining Company's dam, which included putting in a new type of partitions, were completed. As this involved alterations to an existing fishway the work was done by the department under subsection 4 of section 31 of the Fisheries Act at a cost of \$91.76.

16. *Newcombe Brook, Halifax County*.—An unused dam owned by George Monk was inspected. Owing to its condition the construction of a fishway was not feasible, but the owner was notified to provide an opening in the gate to permit the passage of fish.

17. *Ship Harbour River, Halifax County*.—Fishway in the John Lewis Company's dam was inspected and directions for certain repairs given to the manager of the company.

18. *Liscomb River, Guysboro County*.—Representations having been made that a passage for fish should be provided at the dam on this river owned by the Goldenville Mining Company, an inspection of the condition at that location was made. Owing to the fact that an impassable falls, the construction of a fishway through which is practically impossible, exists immediately below this dam, it was not considered that any action to require the owners of the dam to provide a fishway therein was necessary.

19. *St. Mary's River, East Branch, Guysboro County*.—A dam being built by the Sonora Lumber Company at Fisher's Mills was inspected and plans for a fishway furnished to the company.

20. *Salmon River, Guysboro County*.—Dam owned by John McPherson on this river was inspected and information for the reconstruction of the fishway, which together with a portion of the dam had been destroyed by heavy ice, given the owner. As the reconstruction involved alterations to the original design one-half the cost of the new fishway was paid for by the department, under subsection 4 of section 31 of the Fisheries Act, amounting to \$100.

21. *Benacadie River, Cape Breton County*.—Inspection of obstructions which included diversions of the main channel and accumulations of debris was made and remedial work carried out at a cost of \$149.95.

22. *McIntosh Brook, Cape Breton County*.—Inspection of obstructions was made. This stream was so seriously obstructed for a distance of some two hundred yards that it was considered advisable to open up an entirely new channel. Remedial work was completed at a cost of \$200.

23. *Cochrane's Brook, Cape Breton County*.—Obstructions extending over about a mile of this stream and consisting of jams of old logs and debris were inspected and the removal of the same effected at a cost of \$100.

24. *Black Brook, Cape Breton County*.—A channel was blasted through a ledge of flat rock across the river to confine the water to a deeper and more defined stream so as to permit the passage of fish at a cost of \$30.

25. *North River, Victoria County*.—An inspection of a falls on this river was made and directions given for blasting out a passage through them so as to permit the ascent of salmon. The work was completed at a cost of \$298.91.

26. *Hatchery Brook, Inverness County*.—Obstructions to the ascent of fish consisting of jams of old logs, roots and debris were removed at a cost of \$89.

27. *River Inhabitants, Inverness County*.—This river was obstructed at three points by jams of old logs, roots and debris which had accumulated during freshets. The removal of all obstructions was effected at a cost of \$135.75.

28. *O'Law Brook, Inverness County*.—Obstructions consisting of old log and debris forming a jam were removed at a cost of \$24.90.

29. *Prairie Brook, Inverness County*.—The removal of an obstruction to ascending fish, consisting of old logs, roots and debris, was removed at a cost of \$49.50.

30. *Shinimecas River, Cumberland County*.—A dam about three miles from the mouth of this river was inspected and information for the design of a fishway obtained. Owing to the fact that several miles of this river above the dam did not show any evidence of being suitable for spawning grounds it was decided to defer action on the fishway pending a more comprehensive examination of the upper waters.

31. *Maccan River, Cumberland County*.—A dam on the upper waters of this river was inspected. Owing to its rather unstable condition it was not con-

sidered feasible to build a fishway without seriously endangering it. As there are several miles of good spawning grounds in this river below the dam as well as two or three good tributary streams coming in, it was not considered advisable to have the fishway built.

32. *River Philip, Cumberland County*.—Fishway at Oxford Light and Power Company's dam was inspected and instructions issued for a slight modification to make it more effective. A heavy wire screen was placed over the fishway to prevent poaching. Rocks were placed in the tailrace and waste-gate channels where poaching is most difficult to control and accumulations of debris cleared away. The cost of work was \$128.71.

33. *Gaspereau River, Kings County*.—The fishway in the power dam was inspected and found effective.

34. *Nictaux River, Annapolis County*.—

(a) As large numbers of salmon were retarded below Nictaux falls in this river during low water, channels were blasted and concrete wings built to provide a passage at a cost of \$464.67.

(b) The fishway in the town of Middleton's electric power dam was inspected and instructions issued for certain modifications to make it more effective.

(c) The control dam owned by the town of Middleton was inspected. Gates in this dam were kept open and there is no necessity for a fishway while the present arrangement is maintained.

35. *Annapolis River, Annapolis County*.—The dam on this river at Lawrence town was inspected and the fishway found to be effective.

36. *Salmon River, Digby County*.—Obstructions to the ascent of salmon consisting of jams of old logs and debris were inspected. The removal of these obstructions was effected at a cost of \$56.25.

37. *Milton Pond, Yarmouth County*.—The fishway was inspected and instructions issued for certain alterations to the lower end thereof to make it more effective, which were completed at a cost of \$19.53.

#### NEW BRUNSWICK

1. *Wheaton Lake, Charlotte County*.—A screen to prevent the escape of bass into the outlet stream of this lake has been maintained for some years. Repairs and renewals were made during the season at a cost of \$47.40.

2. *Magaguadavic River, Charlotte County*.—

(a) A complete instrumental survey was conducted of the falls at the mouth of this river for the purpose of designing a fishway to admit the passage of salmon, at a cost of \$61.39.

(b) An inspection was made at the second falls and information for improvement of the passage for salmon obtained.

3. *Pocologan River, Charlotte County*.—An inspection of obstructions which retarded the ascent of salmon, thus leading to poaching, was made and work to remove such obstructions, together with the clearing of brush at several places adjacent to the river, was completed for \$392.85.

4. *New River, Charlotte County*.—Inspection of this river was made and no obstructions found with the exception of one old dam through which there was a small opening. Instructions were given to have this opening enlarged.

5. *Musquash River, St. John County*.—An inspection was made at the dams of the New Brunswick Hydro-Electric Commission dams on the east and west

branches. Owing to the conditions created by the development of the power, it was not considered feasible to install fishways.

6. *Black River, St. John County.*—An inspection of conditions for the ascent of salmon in this river was made. Arrangements were completed for having some blasting done to improve the channel at one point, but owing to high water occurring at the only time when the services of the Departmental Foreman were available, the work was not completed.

7. *Nashwaak River, York County.*—The construction of a concrete wing in the river immediately below the dam on the Nashwaak Pulp and Paper Company, Limited, in order to improve the channel for the passage of salmon into the fishway was completed at a cost of \$55.66.

8. *Nashwaaksis River, York County.*—Inspected a dam on this river owned by the Hawkins Lumber Company. Owing to the unimportance of the stream it was not considered that the owner should be required to install a fishway.

9. *Tobique River, Victoria County.*—

- (a) Inspected Fraser Companies' dam at Plaster rock and found fishway to be in good condition and effective.
- (b) Consulted with Mr. Donald Fraser regarding the company's proposal to build a dam at Red rapids. Nothing definite had been decided upon for that season, and Mr. Fraser stated that it was now quite possible that the dam would not be built.
- (c) As representations had been made regarding the condition of the river at Riley's brook, and the department urged to do some work, an inspection of the location was made. It was ascertained that the principal concern of those making the representations was that freshets were changing the gravel bars in the river, thus spoiling some of the angling pools. As there was no evidence that the passage of salmon was in any way impeded, action to meet the wishes of those interested was not recommended.

10. *Salmon River, Victoria County.*—An inspection of the fishway completed in Joseph Cote's dam on this river in 1924 was made. It was found to be in good condition and effective.

11. *Meduxnekeag River, Carleton County.*—An inspection of the dam at the mouth of this river was made and a survey conducted for the construction of a fishway therein. A notice was later served on the owners of the dam to construct the fishway.

12. *Nepisiquit River, Gloucester County.*—Representations having been made to the department that a dam on this river, owned by the Bathurst Lumber Company, was proving a deterrent to the passage of salmon an inspection was made and in consultation with the officials of the company advice was given for the improvement of this condition. The company agreed to have the necessary alterations to its dam made.

13. *Madawaska County.*—As the Madawaska Fish and Game Protective Association had requested that the department cause fishways to be built in a number of dams in that county, a meeting of that association was addressed, pointing out that owing to the location of all the rivers in question above Grand falls on the St. John river, nothing would be gained by installing fishways as no migratory fish could return to them owing to the falls.

#### PRINCE EDWARD ISLAND

Fishways in dams on Prince Edward Island to permit the ascent of sea trout, and in some cases salmon, to the upper waters of the rivers have been persistently urged for several years. There are no crown lands on the island

and all mill ponds and streams are on privately-owned lands. It would accordingly be within the rights of the owners to either lease the fishing privileges or to restrict them to such extent as they might desire. Moreover, all the dams on the larger streams have been in existence for a great number of years and in no instance was it found that the present owner was the original one. There had never previously been any fishways in dams on the island and the present owners had acquired the properties without knowledge of the requirements regarding them. As it did not appear equitable to require the present owners of the dams to build fishways therein at their own expense, the department adopted the policy that it would build and maintain them in dams on desirable streams after such had been approved, on the condition that a proper understanding was procured in each instance that the public would be allowed so long as the fishway was maintained by the department, to fish in the streams, subject to the regulations of the department.

Under this policy the following fishways were built in 1925:—

1. *New Glasgow River, Queens County.*—Fishway in the New Glasgow Rolling Mills' dam, at a cost of \$272.87.
2. *Vernon River, Queens County.*—Fishway in the Ross dam, at a cost of \$314.39.
3. *Desable River, Queens County.*—Fishway in the Dickson dam, at a cost of \$362.49.
4. *Morell River, Kings County.*—Fishway in Laird's dam, at a cost of \$368.80.

It is pleasing to note that the effectiveness of these fishways was definitely ascertained in two instances immediately after completion, sea trout being seen to pass through them in some numbers as soon as they were opened up.

5. *Dunk River, Prince County.*—An inspection of a dam on this river was made, but owing to extensive repairs being made on the dam it was not considered advisable to proceed with the construction of a fishway until a later time.

6. *Montague River, Kings County.*—An inspection of the Montague Electric Light Company's dam was made and information for the design of a fishway obtained.

#### MANITOBA

No fishways were built in this province during the year.

#### SASKATCHEWAN

1. *Cowan River.*—Plans for the construction of a fishway in a dam on this river were made and submitted to the Department of Public Works, which has supervision over the dam.

#### ALBERTA

1. *Waskatenan Creek.*—The Canadian National Railways completed a fishway in its dam on this creek under the direction of the department.

2. *Pipestone Creek.*—Arrangements were made with the Canadian Pacific Railway to build a fishway in its dam on this creek.

3. *Oldman River.*—A thorough investigation regarding the need for a fishway in the dam at the headworks of the Lethbridge Northern Irrigation District was conducted. As a result of information obtained, it was decided not to require this fishway. The question of providing screens was also fully investigated and decided against as no practical scheme for maintaining them could be devised.

#### GENERAL

Periodical inspections were maintained by each fishery overseer of the fishways in his subdistrict, throughout the open water season.

# BRITISH COLUMBIA—REPORT OF J. McHUGH, RESIDENT ENGINEER

Major obstructions to the ascent of fish were removed from the following streams during the calendar year of 1925, the amounts expended in each case being bracketed with the name of the stream:—

(1) Yakoun river, (Queen Charlotte islands).....	\$ 610 25
(2) Birkenhead river, (Mainland).....	487 98
(3) Demanuel creek (Vancouver island).....	454 76
(4) Dean river (Mainland).....	432 83
(5) Stamp falls (Vancouver island).....	405 32
(6) Kwaye river (mainland).....	300 00
(7) Atnarko river (mainland).....	263 95

1. *Yakoun River, Queen Charlotte Islands.*—The expenditure on this stream was necessary for the purpose of clearing away an accumulation of debris from the mouth thereof and for a distance of five or six miles along its course, such debris having accumulated since the heavy expenditure some two or three years ago. As was pointed out in the detailed report concerning obstructions on this stream, there should not, in the ordinary course of events, be any necessity for further large expenditures here, if a certain amount of labour be performed by the men on patrol at Masset inlet during the season, or at the close thereof, and arrangements were made, whilst on the ground, by the supplying of an outfit of tools for this purpose, to have this work done by the resident officer from year to year. It is further noted in this detailed report that the most impassable log jams become loosened and disintegrated during certain freshet periods and heavy expenditure might be, at times, avoided when necessity for immediate clearance is not paramount. Pink salmon in enormous numbers frequent this stream.

(2) *Birkenhead River, Mainland.*—Work on this river was more in the nature of protection work to prevent further erosion of a portion of the banks, thereby depositing additional log refuse in the stream and at the same time endangering the stability of the Pemberton hatchery, which is located on the banks of the river in this vicinity. This work consisted of excavating a dry channel in the bed of the stream, opposite the bank where additional scour was feared, and the construction of crib work protection along this bank. The results have been quite favourable, although it was not, at the time, possible to excavate the new channel to the depth desired owing to a rapid rise in the river. This condition is being taken care of during the present calendar year, at low water season. Sockeye salmon in particular frequent this stream.

(3) *Demanuel Creek, Vancouver Island.*—Work on this creek consisted of the removal of a huge log jam, 14 yards wide by 150 yards long, and 10 feet or more in depth in places, which was all cut, piled, and completely and successfully burned clear. Cohoe salmon and steelhead frequent this stream in large numbers.

(4) *Dean River, Mainland.*—The work on this stream consisted of the construction of a by-pass about 40 feet in length around a fall in the bed of the stream which at high water created conditions of great difficulty. It is confidently hoped that as a result of the work performed, salmon will be able to pass this fall without undue delay in future.

(5) *Stamp Falls, Vancouver Island.*—The work on Stamp falls was performed in an endeavour to remove certain protruding rocks from the crest of the main falls, and the excavating of a series of pockets in the rock on the extreme right bank for the purpose of assisting the ascent of fall salmon into Great Central lake. Some years ago, surveys were made and estimates prepared for the construction of a fishway around these falls, that would safely take care of all varieties of salmon entering Great Central lake, but owing to the heavy

cost of the proposal, and the desire of the Provincial Government that the development of the water-power on Stamp falls should not be hindered by any restricting fishery regulations, the work was never proceeded with. The work done this year was for the purpose of temporarily alleviating a condition of extreme gravity when large numbers of fish were observed dying around Stamp falls. Efforts made were successful as far as the passage of the coho and steel-head are concerned, but it cannot be hoped that sockeye salmon can ever reach Great Central lake until the larger and more comprehensive scheme is executed, and it is not likely that the objections to this, which have been registered by the Provincial Government, will ever be removed.

(6) *Kwaye River, Mainland.*—The work done on this stream was mainly occasioned by the extremely dry season, which did not give ascending fish a chance to take full advantage of the work that was done in previous year. Owing to the fact that enormous numbers of salmon were observed to be dying as a consequence of their inability to ascend, a channel was excavated in a suitable place around the falls, which enables the salmon to pass by. This stream is noted for the exceedingly heavy run of pink salmon.

(7) *Atnarko River, Mainland.*—The work on the Atnarko river consisted of the removal of the various log jams which from time to time accumulate in this stream after the annual freshets, and which are removed each year after they have formed, by the overseer for the district and such men as he can conveniently arrange to take in with him. All this work has been done in the interests of the various species of salmon which frequent this stream.

In addition to these larger expenditures, other small obstructions, costing as shown, were removed from the following streams, for the purpose of assisting the salmon to their spawning grounds:—

Granite bay.....	\$ 25 40
Crawford creek.....	95 00
Kimsquit river.....	164 52
Skutz falls.....	27 10
Salmon river (Kamloops).....	136 10
Capilano river.....	30 75
Bridge river.....	40 35
Camp river.....	133 50
Hells gate.....	20 20
Louis creek.....	13 12
Mann creek.....	35 13
Sweltzer creek.....	121 75
Englishmans river.....	85 48
Hyas creek.....	87 55
Deep Bay cove creek.....	131 75
Sucker creek.....	10 00
Quatsi river.....	54 00
Lardo river.....	42 20
General account.....	1 50

The entire list of obstructions removed during the year under review comprises twenty-five separate pieces of work, scattered through the length and breadth of the province, each requiring its own particular inspection and treatment.

There has been no fishway construction during the year, neither have any reports appeared pointing to defects in any of the existing fishways in the province.

The sum of approximately \$3,000 was expended on the creek which supplies water to the Rivers Inlet hatchery, Medowse creek, which during the fall months, when in freshet, tore away banks, undermined the hatchery and partially assisted in demolishing the boat house, and washed away a portion of the pipe line. It was necessary to redirect the water of the stream back to its own channel and to reinforce the banks of the creek with rock and brush in order that the buildings might not further be endangered. In addition to this the sum of \$1,200 was spent on repairs and renewals to the wharf and boathouse,

\$200 for repairs to the hatchery foundations, and approximately \$500 for repairs to the pipe line. This stream will always be difficult to maintain on account of the extreme violence of its freshets, and a certain amount of protection work will be necessary every year in order to protect the buildings which are in use at this point.

During the months of June and July extensive repairs to the walls and foundations of the Babine Lake hatchery were performed, costing approximately \$1,500. The Babine Lake hatchery is an old log building, constructed almost twenty years ago. Owing to decay the foundations had become impaired, and the walls of the building were bulging badly. Very satisfactory repairs, however, were performed on the building, new logs being introduced in places, and it is now in shape for many additional years of service.

During the months of August and September the old hatchery establishment at Cultus Lake, which had outlived its usefulness as a temporary structure, was torn down and a new hatchery and dwelling house for the men constructed on the same ground. The hatchery itself consists of a frame building measuring 34 feet by 56 feet, containing thirty-nine troughs and having a capacity of 5,000,000 sockeye eggs. The hatchery is of frame construction, 2 by 6 studs, unlined inside, covered with shiplap, tar paper and cedar siding on the outside, and rests on an 8-inch concrete wall, stretching clear around the building. The floor consists of the original dirt floor, having a 2-foot passage in between the rows of troughs, laid with duck boards in convenient sections for handling and removal. All troughs are new, together with their trestles, outlets and head tank. The roof is supported on four timber trusses, consisting of 6-inch by 8-inch tie beams, 4-inch by 6-inch principals, 4-inch by 4-inch purlins, 4-inch by 4-inch struts and 1½-inch truss rods. These trusses are spaced evenly throughout the building, which is lighted by eight 50-candle power lamps suspended from the tie beams on counterweights, the current for same being procured from a Belco lighting system operated by the Chilliwack Parks Board close by. The total cost of this building, including all its equipment, light and power line, painting, etc., was considerably under \$3,000.

The men's quarters consists of a frame house measuring 28 feet by 26 feet, and provides a combined living and dining room, two bedrooms, each with a clothes cupboard, a good-sized kitchen and bathroom. The house is plastered inside and provided with full plumbing services, hot and cold running water in bathroom and kitchen, fully wired and lighted by electricity and heated by a large heater in the living room. The place is extremely comfortable, and cost slightly under \$1,600.

In addition to this work, many inspections were made by the engineering staff during the year, including the Kimsquit and Dean river obstructions, Bridge River rapids, Granite creek, Valdez island, Prospect lake and Fraser River canyon, together with the inspections incidental to the removal of obstructions in the various streams.

The construction of the Cariboo road, Fraser River canyon highway, through the Fraser canyon in the vicinity of Hells gate and China bar, has necessitated conferences with the Provincial Government and various inspections for the purpose of assisting in minimizing, as far as possible, possibilities of further damage to the Fraser river in this vicinity, incidental to the highway construction.

Finished plans were prepared for the proposed new sheds at Digby island and work was completed on the warehouse and marine ways at Poplar island, Fraser river. It was necessary to give much time to the work of the Biological Board during the year, and several visits were paid to the biological station at Departure Bay for conferences with the director of that station. In collaboration with the Provincial Government plans were prepared for the proposed Biological Station at Prince Rupert, which, owing to certain unfortunate circum-

stances in connection with the location, was not commenced during the year. It is hoped, however, to have this establishment completed during the early part of the year 1926.

A new seven-room bungalow was constructed for the Director of the Biological Station, Nanaimo, B.C., at a cost of \$5,250, and a new five-room bungalow for the use of the Biological Board at Cultus Lake was constructed at a cost of \$3,500. Both of these buildings were constructed under contract, and excellent value was received from the contractors in each case. Plans and specifications for both of these works were prepared in this branch of the department, which likewise provided the necessary supervision during construction.

Construction was also commenced on a fence, approximately 170 feet long and 14 feet wide, across the bed of Sweltzer creek, which drains Cultus lake into the Vedder river. This fence is being constructed for the purpose of endeavouring to obtain an exact count of the number of sockeye yearlings and fry which migrate from Cultus lake in the spring. This is a work required by the Biological Board in the course of its investigations, and plans for the fence were completed in this office in collaboration with both Drs. Clemens and Foerster, of the Biological Board staff. The fence consists of a platform of 2-inch planks, 14 feet wide, laid on sills at suitable intervals which in turn rest on piles driven into the bed of the stream, both up and down stream faces being sheet piled with 2 by 6 tongued and grooved sheet piling to prevent scour and undermining. On this platform are to be erected panels of heavy closely woven wire, which will divert migrating fry into six counting pots, each 10 feet by 8 feet, which have been constructed on an extension of the aforesaid platform. The wire screens will consist of moveable panels each 10 feet in length, moving in slides like window sash. Each panel is in duplicate, so that when one clogs its counterpart can be lowered into place while the clogged screen is lifted and cleaned. Fry will be diverted by this fence into the counting pots, which are to be fitted with a device permitting regular exit and counting. All the work necessary on this fence was completed during the fall months while the water was at its lowest ebb. The wire screens will be inserted early in 1926, when the first trial count will be made. The numbers of parent sockeye salmon entering Cultus lake last fall were carefully counted, and if the operation of the fence proves to be successful, much valuable data will be procured.

In addition to the foregoing the large scale maps have been kept up to date and a considerable amount of new material added to them as a result of the various investigations and inspections made by officers of the department from time to time during the year.

## APPENDIX 5

## FISHERIES

## FINANCIAL STATEMENT 1925-26

Vote No.	Service	Appropriation	Expenditure
239	Salaries and disbursements, F.O., Fisheries Patrol Service, Fisheries Protection Service.....	880,000 00	789,870 14
240	Building fishways, etc.....	30,000 00	9,523 58
241	Legal and incidental expenses.....	2,000 00	1,995 62
242	Conservation and development of deep-sea fisheries.....	95,000 00	70,145 40
243	Fisheries Intelligence Bureau.....	2,000 00	423 24
244	Inspection of canned and pickled fish.....	25,000 00	23,002 67
245	Fish culture.....	370,000 00	342,836 72
246	Investigations.....	10,000 00	9,949 04
247	Marine Biological Board.....	42,000 00	42,000 00
24 Stat'y.		1,456,000 00	1,289,746 41
	Civil Government salaries.....	96,500 00	94,431 66
	Contingencies.....	20,000 00	14,487 67
	Fishing bounty.....	160,000 00	159,984 80
		1,732,500 00	1,558,650 54
396	Gratuities.....		250 00
396	Revision of salaries, etc.....		1,265 01
			1,560,165 55

1861-1862

## FISHERIES BRANCH



## SUMMARY

Provinces	Inspector's, Overseer's and Ward's	Allowances				Gasolene and Oil	Special Guardians		Sundry	Total
	Salaries	Disb.	Auto	Boat	Horse		Wages	Expenses		
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
Nova Scotia.....	64,871 68	11,318 56	11,118 28	1,161 02	300 00	384 02	35,248 82	868 40	297 89	125,568 67
Prince Edward Island.....	11,925 00	2,822 83	1,600 00	300 00		397 60	7,199 34	10 00	471 67	24,726 44
New Brunswick.....	39,337 16	5,942 99	6,800 00	1,841 66	354 00	1,297 69	21,582 65	10 00	713 85	77,880 00
Quebec.....		13 40							265 50	278 90
Manitoba.....	9,400 00	3,743 89		262 50	1,025 00		952 45	1,247 92	52 94	16,684 70
Saskatchewan.....	10,945 00	3,994 31	225 00	150 00	1,000 00		607 50	1,178 45	55 63	18,155 89
Alberta.....	10,300 00	4,538 51	375 00	281 25	750 00		1,075 00	1,362 15	62 81	18,744 72
British Columbia.....	58,835 68	22,230 35					15,779 08	4,670 61	5,486 85	107,002 57
General Account.....		1,526 77							14,165 03	15,691 80
	205,614 52	56,131 61	20,118 28	3,996 43	3,429 00	2,079 31	82,444 84	9,347 53	21,572 17	404,733 69

## DETAILED STATEMENT OF EXPENDITURE—FISHERIES PATROL SERVICE, 1925-1926

Establishments and Accounts	Paylist \$	Board or Prov'n.	Fuel	Repairs		Supplies			Clothing	Sundry		Total
				Hull	Engine	Engine	Deck	Stewards		\$	cts.	
<i>Nona Scotia</i> —												
"Mildred McColl"	3,604 83	1 15	1,260 04	281 04	434 45	191 62	74 53	97 79	23 20	104 40	6,073 05	
"A"	2,299 40	2 71	447 68	73 16	470 45	122 27	7 72	13 89	32 27	64 60	3,554 15	
	5,904 23	3 86	1,707 72	354 20	904 90	313 89	82 25	111 68	55 47	169 00		9,607 20
<i>Prince Edward Island</i> —												
"Upperhand" (chartered)												
"Daisy"			216 27			32 98	2 30	3 51		650 00	2 30	
"Mary Spring"	468 88		107 07			17 40	8 00	4 22		158 00	763 57	
"Ostrea"				74 95		6 29		1 17			82 41	
"Richmond"	1,093 34		143 64	30 27	7 60	46 42	19 90	3 85		35 28	1,380 30	
	1,562 22		466 98	105 22	7 60	103 09	30 20	12 75		843 28		3,131 34
<i>New Brunswick</i> —												
"Phalarope"	4,380 00		938 36	56 46	146 19	162 50	44 17	86 48		6 64	5,820 80	
"Shannon" (chartered boat)	2,580 00		685 17			29 68	5 78			605 15	3,905 78	
	6,960 00		1,623 53	56 46	146 19	192 18	49 95	86 48		611 79		9 726 58
<i>Manitoba</i> —												
"Bradbury"	9,962 66	2,587 80	5,706 23	589 88	114 75	505 09	1,319 56	175 51	476 31	813 47		22,251 26
<i>British Columbia</i> —												
General Account	3,197 19	35 00	112 25	17 53	283 83	1 50		0 69	28 68	687 97	4,364 64	
Poplar Island Warehouse	1,140 00		90 10	18 78	39 99	259 76	233 26	12 55		506 63	2,801 07	
Sapperton Warehouse										0 50	0 50	
<i>Chartered Boats</i> —												
"Agnes W. Dods"	1,325 22		187 52			30 85				838 85	2,352 44	
"Akash"	655 73		124 57			26 60				1,065 05	2,071 95	
"Alberta"	100 00										100 00	
"Amy S."	895 8		357 88			59 37		3 12		1,098 00	2,414 25	
"A.N."	200 00		5 20			4 20		2 00		62 00	273 40	
"Annie May"	787 50		298 57	72 89	3 50	30 13				856 00	2,048 59	
"Aramac"	506 66		103 96			43 25				155 00	808 87	
"Bedwell"	84 00										84 00	
"Bide-a-wee"	225 81		62 30			13 90		2 00		70 00	374 01	
"Bill"	393 33		9 68			6 34				272 55	681 90	
"Bluebird"	300 00		52 19			18 25				62 00	432 44	
"Shore Boy"	709 00		189 97			39 10		4 21		728 33	1,670 61	

"Colby"	200 00	37 44	15 75	1 60	84 00	284 00
"Corycia"	225 81				74 80	355 40
"Cross"					120 00	120 00
"Dawn"	55 48	14 62	7 09		18 00	95 19
"Dorothy N."	1,200 00	247 70	37 66	3 08	410 80	1,913 24
"Dustie"	440 59	75 23	11 72	3 24	585 00	1,115 78
"Ectoba"	493 39	162 84	28 68	3 24	786 00	1,474 15
"Echo No. 1"	860 08	175 43	31 15	3 12	936 00	1,885 78
"Elk"	470 00	46 32	14 26	3 86	145 00	679 44
"Erie"	160 00	20 00	1 50		48 50	230 00
"Esperanza"	978 57	429 75	72 00	2 25	265 00	1,747 57
"Five Birches"	273 23	25 66	1 35		76 50	376 74
"Flying Spur"	947 34	337 57	40 60	5 76	780 00	2,111 27
"Green Terror"	156 67	33 43	9 81		48 00	247 91
"Grizzly"	780 00	149 64	36 11		629 20	1,594 95
"Iona"	361 29	63 72	11 15		111 00	547 16
"Kahtaloma"		57 60				57 60
"Kenay"	77 42	25 04	8 96		165 00	289 27
"Lawson"	225 81	53 10	10 25	2 00	69 00	360 16
"Leinsh"						53 02
"Lemon"	461 29	83 60	4 25		142 00	691 14
"Limit"	166 66	16 94	1 05	0 48	35 50	220 63
"Lively"	461 29	38 99	3 52		143 00	646 80
"MacLaren"	300 00	72 79	15 75		110 00	498 54
"Marie S."	667 16	269 59	46 49	1 62	525 00	1,509 86
"Mary Ellen"	100 00				100 00	100 00
"Megan"	146 67	25 73	2 66		45 50	220 56
"Murbros"					682 05	1,506 81
"Myfanwy"	600 00	176 90	33 21	1 60		17 00
"Nan"	641 72	60 12	11 65		201 00	914 49
"Nelmar"	731 51	128 87	13 69	1 56	272 00	1,151 98
"Odessa"	696 17	229 40	27 60		784 30	1,737 47
"Oh Boy"	813 07	334 01	58 63	77 04	1,070 00	2,352 75
"Olive"	347 42	68 55	5 76		107 10	528 83
"Pontiac"	305 91	56 00	9 00		87 00	457 91
"Reliance"	1,417 50	107 27	38 88	3 59	1,166 33	2,733 57
"Skyhawk"	100 00	82 83	17 10		62 00	261 93
"Sea Dog"	453 33	14 49	3 20	2 25	140 99	614 26
"Sophanne"	711 29	203 67	39 42		679 00	1,633 38
"S. Queen"	370 00	96 01	34 63		101 00	601 64
"Stubbs"	500 00	111 65	12 60		155 00	779 25
"Ukatow"	940 16	315 38	43 82	3 12	1,024 00	2,326 48
"Votomac"	156 67	16 85	2 72		1,49 00	235 24
"Wabash"	903 88	664 61	122 24	4 86	1,230 00	2,925 59
"Wonder"	146 67	10 30	2 66		45 50	205 13
"W.T."	186 67	37 08	11 40		58 00	293 15
						54,035 48

## DETAILED STATEMENT OF EXPENDITURE, FISHERIES PATROL SERVICE, 1925-1926—Concluded

Establishments and Accounts	Paylist	Board or Prov'n.	Fuel	Repairs		Supplies			Clothing	Sundry	—	Total
				Hull	Engine	Engine	Deck	Stewards				
	\$	cts.	\$	\$	cts.	\$	\$	cts.	\$	cts.	\$	cts.
<i>Departmental Boats—</i>												
"Alina"	695 33		55 93	6 90	44 80	31 43		2 07		2 50	141 56	
"Babine No. 1"	831 43		96 61	9 07	8 59	20 11	13 47			92 90	938 15	
"Babine No. 2"	959 51		96 61	9 07	15 60	23 22	28 68	20 06		42 90	1,067 57	
"Black Raven"			301 33	380 35	4,310 03	269 45	74 46	90 89		81 43	6,467 45	
"Bonila"	2,816 40		871 31	378 65	116 50	181 92	70 38	169 94		36 23	4,641 33	
"Cloyah"	2,657 23		601 45	232 28	309 29	185 66	54 34	30 56		567 95	4,638 76	
"Cohoe"	961 96		455 84	192 14	33 98	74 20	27 87	38 12		15 99	1,817 43	
"Egret"	1,500 00		361 46	144 80	241 98	22 13	17 07	60 92		60 28	2,408 64	
"Elk"	3,420 00		355 40	77 30	82 18	1 49	12 10	23 62	7 36	17 89	3,997 34	
"Foam"	4,529 17		494 23	65 18	189 96	35 02	33 95	43 73		143 08	5,534 32	
"Gull"	1,550 40		248 96	504 20	289 98	203 29	29 89	46 15	8 91	61 27	2,943 05	
"Hawk"	1,571 19		290 14	172 57	50 42	72 95	17 86	13 67		9 35	2,198 15	
"Heron"	1,446 62		476 74	522 01	96 48	85 23	45 63	74 57		37 10	2,784 38	
"Humming Bird"			5 60			2 92					8 52	
"Linnett"	1,402 67		580 87	118 10	52 40	74 72	13 64	17 25		56 59	2,316 24	
"Marfish"	5,121 58		2,105 83	492 00	236 27	191 67	624 68	200 80	94 80	334 51	10,630 10	
"Merlan"	1,286 79		305 72	150 70	12 00	76 15	37 80	20 07			1,889 23	
"Merrysea"	4,500 00		229 25	856 84	4,904 22	89 76	106 28	55 66	16 65	150 25	10,908 91	
"Oyashimo"	1,250 65		148 70			17 09				1,226 50	2,642 94	
"Ridedis"	2,478 00		290 95		356 08	293 29	94 39	74 14		497 53	4,174 99	
"Svan"	2,400 00		480 00		59 00	56 26	20 20	74 03		25 09	5,348 93	
"Vanidis"	6,263 23		498 25	357 91	356 08	342 79	79 53	257 25	64 56	591 95	9,742 60	
"Vedder"	3,420 00		232 80	29 01	65 66	62 74	6 63	36 60	15 34	13 34	3,882 12	
	83,913 20	2,244 01	16,454 89	5,236 21	11,984 77	3,826 71	1,667 81	1,498 94	263 28	24,734 58		151,824 40

## SUMMARY

Nova Scotia.....	5,904 23	3 86	1,707 72	354 20	904 90	313 89	82 25	111 68	55 47	169 00		9,607 20
Prince Edward Island.....	1,562 22		466 98	105 22	7 60	103 09	30 20	12 75		843 28		3,131 34
New Brunswick.....	6,960 00		1,623 53	56 46	146 19	192 18	49 95	86 48		611 79		9,726 58
Manitoba.....	9,962 06		5,706 23	589 88	114 75	505 09	1,319 56	175 51	476 31	813 47		22,251 26
British Columbia.....	83,913 20	2,244 01	16,454 89	5,236 21	11,984 77	3,826 71	1,667 81	1,498 94	263 28	24,734 58		151,824 40
	108,302 31	4,835 67	25,959 35	6,341 97	13,158 21	4,940 96	3,149 77	1,885 36	795 06	27,172 12		196,540 78

## DETAILED STATEMENT OF EXPENDITURE, FISHERIES PROTECTION SERVICE, 1925-1926

Establishments and Accounts	Paylist	Board or Prov'n.	Fuel	Repairs		Supplies			Clothing	Sundry	—	Total
				Hull	Engine	Engine	Deck	Stewards				
	\$	cts.	\$	\$	cts.	\$	\$	cts.	\$	cts.	\$	cts.
General Account.....										137 94		137 94
<i>East Coast—</i>												
"Arleux".....	20,185 35	4,701 43	6,659 67	143 63	2,742 91	578 62	510 11	487 26	1,447 25	633 20		38,089 43
"Arras".....	21,319 69	7,455 25	8,524 35	1,061 41	2,553 73	733 32	641 57	455 36	1,448 06	1,279 95		45,473 29
"Franklin".....	21 00	394 35						8 75		803 69		1,227 79
	41,526 04	12,551 03	15,184 02	1,205 04	5,296 64	1,311 94	1,151 68	951 37	2,895 91	2,716 84		84,790 51
<i>West Coast—</i>												
"Givenchy".....	24,958 51	6,006 01	7,672 68	3,736 19	1,070 72	1,009 52	435 21	1,204 98	1,368 72	1,002 81		48,515 35
"Malaspina".....	29,892 56	7,229 93	9,679 60	1,665 77	646 44	1,252 22	676 20	1,118 23	1,687 01	1,303 91		55,151 87
	54,851 07	13,235 94	17,352 28	5,401 96	1,717 16	2,261 74	1,161 41	2,323 21	3,055 73	2,306 72		103,667 22
SUMMARY												
General Account.....	41,526 04	12,551 03	15,184 02	1,205 04	5,296 64	1,311 94	1,151 68	951 37	2,895 91	2,716 84		84,790 51
East Coast.....	54,851 07	13,235 94	17,352 28	5,401 96	1,717 16	2,261 74	1,161 41	2,323 21	3,055 73	2,306 72		103,667 22
West Coast.....	96,377 11	25,786 97	32,536 30	6,607 00	7,013 80	3,573 68	2,313 09	3,274 58	5,951 64	5,161 50		188,595 67

## DETAILED STATEMENT OF EXPENDITURE FISH CULTURE 1925-26

Hatcheries	Salaries		Maintenance		Total of Hatchery		Total of Provinces	
	\$	cts.	\$	cts.	\$	cts.	\$	cts.
<i>Nova Scotia</i> .....							30,065	72
Bedford.....	1,440	00	5,526	23	6,966	23		
Lindloff.....			1,240	59	1,240	59		
Margaree.....	4,140	00	2,772	05	6,912	05		
Margaree Pond.....	437	16	3,019	22	3,456	38		
Middleton.....	2,880	00	2,642	82	5,522	82		
Windsor.....	1,500	00	3,579	42	5,079	42		
Truro School.....	72	00	816	23	888	23		
<i>Prince Edward Island</i> .....							4,624	81
Kelly's Pond Hy.....	2,820	00	1,804	81	4,624	81		
<i>New Brunswick</i> .....							50,880	64
Grand Falls.....	2,940	00	4,066	64	7,006	64		
Miramichi.....	3,120	00	3,256	74	6,376	74		
Miramichi Pond.....			2,341	77	2,341	77		
Nepisiquit.....	576	63	1,299	03	1,875	66		
New Mills Pond.....	761	40	2,782	52	4,543	92		
Restigouche.....	3,643	37	1,615	88	5,259	25		
Sparkle.....	564	77	429	41	994	18		
St. John.....	2,820	00	7,493	44	10,313	44		
St. John Pond.....			11,861	75	11,861	75		
Tobique.....			307	29	307	29		
<i>Ontario</i> .....							79,938	10
Collingwood.....	3,120	00	7,240	24	10,360	24		
Kenora.....	3,370	00	8,304	84	11,674	84		
Kingsville.....	4,560	00	5,200	05	9,760	05		
Port Arthur.....	2,895	00	3,330	23	6,225	23		
Sarnia.....	4,020	00	3,965	54	7,985	54		
Southampton.....	3,000	00	10,535	68	13,535	68		
Thurlow.....	6,000	00	6,587	94	12,587	94		
Warton.....	4,290	00	3,518	58	7,808	58		
<i>Manitoba</i> .....							21,265	04
Dauphin River.....			206	00	206	00		
Dauphin River Spawn Camp.....			1,179	82	1,179	82		
Gull Harbour.....	1,680	00	5,307	82	6,987	82		
Winnipegosis.....	2,940	00	9,951	40	12,891	40		
<i>Saskatchewan</i> .....							6,873	95
Qu'Appelle H.....	2,940	00	3,933	95	6,873	95		
<i>Alberta</i> .....							7,655	91
Banff.....	3,015	00	3,246	54	6,261	54		
Jasper Park.....			1	55	1	55		
Spray Lakes.....			1,392	82	1,392	82		
<i>British Columbia</i> .....							114,827	77
General Account.....	7,225	16	2,461	56	9,686	72		
Anderson.....	2,325	36	4,062	97	7,288	33		
Babine.....	2,145	92	7,201	07	9,346	99		
Cowichan.....	3,254	03	3,928	57	7,182	60		
Cranbrook Eyeing Station.....	410	32	245	76	656	08		
Cultus.....	443	55	6,619	58	7,063	13		
Fifteen Mile Creek.....			48	00	48	00		
Gerrard.....	362	58	2,094	42	2,457	00		
Harrison.....	3,166	41	1,579	19	4,745	60		
Kennedy.....	1,921	56	5,930	75	7,852	31		
Lloyd's Creek Eyeing Station.....	577	42	1,883	77	2,461	19		
Nelson Eyeing Station.....	1,050	00	1,726	20	2,776	20		
Pemberton.....	5,335	49	8,726	60	14,062	09		
Pitts.....	1,140	00	4,465	43	5,605	43		
Rivers Inlet.....	2,628	29	13,118	02	15,746	31		
Skeena.....	3,746	28	9,426	22	13,172	50		
Stuart.....	1,440	00	3,237	29	4,677	29		
<i>General Account</i> .....	5,910	00	5,840	84	11,750	84	11,750	84

## SUMMARY

Nova Scotia.....	10,469	16	19,596	56	30,065	72
Prince Edward Island.....	2,820	00	1,804	81	4,624	81
New Brunswick.....	14,426	17	36,454	47	50,880	64
Ontario.....	31,255	00	48,683	10	79,938	10
Manitoba.....	4,620	00	16,645	04	21,265	04
Saskatchewan.....	2,940	00	3,933	95	6,873	95
Alberta.....	3,015	00	4,640	91	7,655	91
British Columbia.....	37,172	37	77,655	40	114,827	77
General Account.....	5,910	00	5,840	84	11,750	84
	112,627	70	215,255	08	327,882	78

## UNDER BIOLOGICAL BOARD

	Salaries		Other expenditure		Total	
	\$	cts.	\$	cts.	\$	cts.
General Account.....			84	63		84 63
Cultus Lake—Biologist.....	2,280	00	1,290	60	3,570	60
Cultus Lake—Counting Experiment, etc.....	1,684	00	2,487	20	4,171	20
Cultus Lake—Bungalow.....			3,525	55	3,525	55
Jasper Park Investigations.....			599	47	599	47
Fresh Water Scheme.....			30	00	30	00
Trout Investigations.....	1,516	45	468	68	1,985	13
Warm Water Survey.....	500	00	487	36	987	36
	5,980	45	8,973	49	14,953	94
Total Fish Culture.....					342,836	72



List of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1925

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed
Adeline.....	6	2	3	Sell fish, supplies, water.....	cwt. 100
Agua.....	6	3	1	Orders.....	
Akutan.....	46	10	10	" " sell fish.....	2,700
Alaska.....	54	15	12	Sell fish.....	3,440
Albatross.....	40	14	10	Bait, ice, sell fish.....	1,940
Alfonso XIII.....	6	6	1	Supplies, water.....	
Alice.....	7	6	1	" " ".....	
Alice B.....	13	5	4	Bait, ice, sell fish, supplies, water.....	40
Alki.....	7	2	10	Sell fish.....	560
Alten.....	43	15	12	Orders, sell fish.....	4,280
America.....	25	11	10	Bait, ice, orders, supplies.....	
Andrew H.....	11	20	1	Supplies, water.....	
Anna J.....	22	6	14	Sell fish.....	1,840
Antler.....	22	5	6	Bait, sell fish.....	120
Aloha.....	19	6	8	Supplies.....	
Arcade.....	14	4	12	Bait, ice.....	
Arctic.....	29	7	10	Sell fish.....	2,440
Arrow.....	40	8	11	" " ".....	2,700
Atlas.....	31	7	10	" " ".....	2,360
Atlantic.....	25	9	7	" " ".....	1,180
Attie.....	35	10	7	" " ".....	2,300
Augusta.....	19	5	13	" " ".....	2,000
Baldy.....	7	5	2	Repairs, water.....	
Baltic.....	20	4	8	Sell fish.....	960
Barb.....	2	2	2	Shelter, water.....	
Bear.....	31	5	1	Supplies, water.....	
Beaver.....	16	5	1	Bait, ice.....	
Bernice.....	4	2	1	Sell fish.....	40
Bessie.....	8	4	2	Shelter, water.....	
Bessie M.....	10	4	1	" " ".....	
Betty.....	15	5	4	Sell fish.....	380
Bluebird.....	4	2	1	" " ".....	20
Bonanza.....	30	5	11	" " ".....	2,140
Bravo.....	10	3	10	" " ".....	720
Brisk.....	37	7	11	" " ".....	2,880
Brothers.....	13	5	11	" " ".....	1,980
Brownie.....	6	2	1	Supplies.....	
California.....	20	5	8	Bait, ice.....	
Cape Clear.....	13	5	8	" " "sell fish.....	240
Caroline.....	4	2	2	Sell fish.....	120
Cascade.....	7	2	1	Bait, ice.....	
Castor.....	6	3	4	Sell fish.....	260
Cedric.....	19	6	6	" " ".....	1,100
Chancellor.....	14	5	7	Bait, ice, sell fish, supplies, water.....	Nil
Chelsea.....	51	10	8	" " " " ".....	2,160
Chimera.....	9	3	10	" " " " ".....	
Chum.....	6	4	9	Sell fish.....	640
Cohoe.....	4	1	2	Shelter, water.....	
Columbia.....	41	9	9	Bait, ice, sell fish.....	3,440
Commonwealth.....	60	17	7	Sell fish.....	1,980
Condor.....	4	2	1	" " ".....	20
Constitution.....	39	13	11	" " ".....	3,780
Cora.....	4	2	11	" " ".....	450
Corona.....	19	11	10	Bait, ice.....	
Curlew.....	18	5	4	" " ".....	
Daily.....	26	7	13	Orders, sell fish, supplies, water.....	2,640
Dalco.....	4	2	1	Water.....	
Defense.....	20	5	8	Sell fish.....	1,180
Democrat.....	27	6	11	" " ".....	2,500
Diamond T.....	8	1	1	" " ".....	40
Discovery.....	10	4	7	Bait, ice.....	
Dora H.....	15	5	1	" " ".....	
Eagle.....	67	16	10	Sell fish.....	5,480

List of United States Fishing Vessels which entered Canadian Ports on the  
Pacific Coast during the year ended December 31, 1925—*Continued*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed  cwt.
Eastern Point.....	4	3	13	"	640
Edco.....	8	6	2	Shelter, water.....	
Eidsvoid.....	15	5	6	Ice, sell fish.....	440
Eleanora.....	16	5	1	Bait, ice.....	
Ellen K.....	5	1	1	Shelter, water.....	
Emblem.....	4	3	5	Sell fish.....	200
E. Neilson.....	15	4	10	"	940
Enterprise.....	8	3	10	Bait, ice.....	
Eureka.....	11	4	11	" " sell fish, supplies, water.....	1,160
Evolution.....	17	5	8	" " supplies, water.....	
Fairway.....	19	5	9	" " sell fish, supplies, water.....	700
Faith.....	7	3	13	" " " ".....	140
F. C. Hergert.....	21	8	3	" " " ".....	
Far West.....	37	5	1	Supplies.....	
Fidelity.....	29	11	1	Water.....	
Flamingo.....	13	5	2	Orders, water.....	
Flattery.....	10	2	9	Sell fish.....	540
Flower.....	3	1	1	Water.....	
Ford.....	4	2	4	Sell fish.....	220
Foremost.....	66	15	10	"	4,660
Fortuna.....	21	5	2	Bait, ice, supplies.....	
Forward.....	18	5	12	" " sell fish.....	1,060
Galveston.....	21	6	4	Sell fish.....	640
Giant II.....	40	5	3	Ice, buying fish.....	
Glacier.....	12	4	13	Sell fish.....	1,760
Gladstone.....	23	6	5	"	780
Gladys.....	11	3	12	"	1,020
Gony.....	12	5	3	" " water.....	60
Grayling.....	16	5	5	"	660
Gretchen.....	7	3	3	Bait, ice.....	
Groth.....	10	4	3	" " sell fish.....	20
Hanna.....	11	5	1	"	
Happy.....	12	4	5	Sell fish.....	560
Harding.....	19	5	7	Bait, ice, sell fish.....	120
Havana.....	41	15	15	" " " ".....	760
Hazel.....	7	3	2	Sell fish.....	120
Hazel H.....	24	5	11	"	1,560
Helen Payne.....	9	2	2	"	100
Helgeland.....	56	15	2	"	480
Hilda.....	10	3	11	"	1,040
Hi Gill.....	12	4	8	"	640
Imperial.....	35	5	9	"	1,160
Inger.....	7	2	7	"	300
Ithona.....	20	5	12	Bait, sell fish.....	1,640
Ivanhoe.....	27	6	9	Sell fish.....	2,400
Jennie F. Decker.....	16	5	14	Bait, ice, supplies.....	
Joseph George.....	6	2	1	In distress.....	
J. P. Todd II.....	12	5	9	Sell fish.....	1,040
June.....	15	5	8	"	860
K. 410.....	5	2	1	Shelter, water.....	
K. 702.....	5	2	2	" " " ".....	
K. 874.....	5	2	1	" " " ".....	
Kanaga.....	47	9	9	Sell fish.....	2,000
Kanatak.....	39	17	7	"	1,680
Katalla.....	16	5	1	"	80
Kennebec.....	4	3	5	"	320
Kodiak.....	38	13	14	Bait, ice, sell fish.....	2,420
L. 532.....	5	2	1	Shelter, water.....	
Lancing.....	16	5	9	Sell fish.....	1,200
La Paloma.....	14	11	8	Bait, ice.....	
Leif II.....	21	3	2	Sell fish.....	780
Lenor.....	14	4	4	"	480
Leviathan.....	29	7	7	"	1,560
Liberty.....	44	15	15	Bait, ice, sell fish.....	880
Lillian M.....	9	3	1	" " " ".....	
Lincoln.....	25	6	3	" " sell fish.....	1,640
Lincoln.....	4	3	3	Sell fish.....	200
Lituya.....	39	9	8	"	1,400
Lola.....	4	2	1	"	20
Louise.....	16	5	8	Bait, ice.....	

**List of United States Fishing Vessels which entered Canadian Ports on the  
Pacific Coast during the year ended December 31, 1925—Continued**

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed
					cwt.
Lummen.....	10	4	9	Sell fish.....	820
M. 2.....	5	1	1	Shelter, water.....	
M. 689.....	4	2	1	Sell fish.....	20
Madeline J.....	25	5	10	Bait, ice.....	
Magnolia.....	25	2	1	Sell fish.....	80
Majestic.....	33	7	12	".....	3,920
Margaret T.....	9	3	1	".....	120
Mariner.....	21	6	10	Orders, sell fish.....	920
Mars.....	9	4	6	Sell fish.....	520
Mary.....	24	5	9	Bait, ice.....	
Mary N.....	4	2	1	Sell fish.....	40
Maude Hazel.....	9	4	1	Shelter, water.....	
May.....	4	2	6	Sell fish.....	300
Mermaid.....	19	5	8	Bait, ice.....	
Merna.....	5	3	1	Shelter, water.....	
Middleton.....	24	6	6	Sell fish.....	1,000
Mildred II.....	31	6	7	Bait, sell fish.....	1,280
Minnie Belva.....	5	2	1	Shelter, water.....	
Myrtle.....	15	5	10	Supplies.....	
Naomi.....	4	2	2	Sell fish.....	120
National.....	20	6	7	Bait, ice, sell fish, supplies, water	800
Neptune.....	43	13	11	" " " " " "	880
Neptune.....	4	1	3	Sell fish.....	120
New England.....	70	28	5	Repairs, sell fish.....	740
Nomad.....	15	4	2	Bait, engine repairs, ice.....	
Norland.....	10	5	1	Sell fish.....	160
Norma.....	6	2	2	".....	120
North.....	27	9	7	".....	2,260
North.....	9	3	10	Bait, ice.....	
Omaney.....	34	12	2	Sell fish.....	560
Onah.....	18	5	16	".....	1,780
Orient.....	48	13	12	Bait, ice, sell fish.....	560
Panama.....	34	13	9	Sell fish.....	2,880
Paragon.....	69	15	7	".....	2,800
Pearl.....	5	1	1	Shelter, water.....	
Pegge.....	4	3	2	Sell fish.....	160
Pelican.....	17	5	6	".....	400
Pershing.....	18	5	1	Bait, ice.....	
Pioneer.....	48	13	9	Sell fish.....	2,520
Pioneer II.....	12	5	2	Engine repairs, water.....	
Pioneer III.....	26	6	10	Bait, ice, sell fish.....	360
Polaris.....	45	14	7	Sell fish.....	2,280
Porlock.....	36	7	7	".....	2,300
Presho.....	14	5	13	Bait, ice.....	
President.....	24	6	4	Sell fish.....	1,040
Prosperity.....	25	6	8	".....	3,600
Pysht.....	24	3	1	Supplies.....	
Radio.....	63	15	8	Sell fish.....	3,240
Rambler.....	10	3	7	".....	420
Ranier.....	39	9	12	Orders, sell fish.....	3,440
Ranier.....	4	3	12	Sell fish.....	820
Reliance I.....	19	5	5	".....	820
Reliance.....	14	5	10	".....	1,200
Reliance.....	11	3	1	".....	40
Reliance.....	7	3	9	" supplies, water.....	380
Relief.....	5	2	1	Shelter, water.....	
Republic.....	51	15	8	Sell fish.....	3,500
Resolute.....	47	10	11	".....	4,400
Restitution.....	24	5	9	Bait, ice, supplies, water.....	
Rival.....	4	3	1	Sell fish.....	80
Roald Amundsen.....	23	6	9	".....	1,800
Rosario.....	16	5	2	Bait, ice.....	
Royal.....	15	5	8	Sell fish.....	1,140
Roosevelt.....	13	5	1	Bait, ice.....	
Sadie K.....	16	5	5	" engine repairs, ice, sell fish	220
Sarah.....	13	2	1	Shelter, water.....	
Scandia.....	39	17	8	Sell fish.....	4,420
Scout.....	5	2	1	".....	20
Sea Lion.....	6	2	1	Supplies.....	
Senator.....	11	6	9	Orders, sell fish.....	1,940

LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1925—*Concluded*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed
					cwt.
Seattle.....	55	15	5	Bait, ice, sell fish.....	1,180
Sentinel.....	21	6	10	Sell fish.....	2,200
Seymour.....	44	15	7	".....	2,240
Sherman.....	18	5	10	".....	1,860
Sirius.....	17	6	10	".....	1,240
Sitka.....	50	15	9	".....	3,020
Star.....	7	3	11	".....	840
Spray.....	25	6	9	Bait, ice, sell fish.....	1,360
Summer.....	34	8	10	Sell fish.....	3,320
Sunbeam.....	5	1	1	In distress.....	
Sunset.....	37	7	9	Sell fish.....	2,760
Sun Wing.....	15	4	1	".....	100
Superior.....	26	6	4	".....	450
Swan.....	9	4	15	".....	840
T. 563.....	4	1	3	Water.....	
T. 690.....	5	3	3	".....	
Tahoma.....	18	7	10	Sell fish.....	1,580
Tatoosh.....	21	6	8	".....	1,560
Teddy J.....	13	3	9	".....	1,140
Terna.....	5	2	1	Shelter, water.....	
Texas.....	16	5	4	Bait, ice orders, sell fish, supplies, water.....	380
Thelma II.....	36	5	6	Bait, ice, supplies, water.....	
Thelma M.....	7	3	1	Sell fish.....	80
Thordenskjold.....	39	13	12	Bait, ice, sell fish.....	1,020
Tillicum.....	21	5	2	".....	40
Topsey D.....	6	5	1	Supplies, water.....	
Trinity.....	41	9	2	Sell fish.....	140
Tyee.....	13	4	4	".....	500
Unimak.....	22	5	18	Bait, ice, sell fish.....	660
Urania.....	27	6	2	Sell fish.....	220
Uranus.....	15	5	16	Bait, ice, sell fish.....	680
Uncle Jim.....	6	10	2	Supplies.....	
Valero.....	6	3	10	Bait, ice, orders.....	
Valid.....	8	3	2	Sell fish.....	140
Valorous.....	21	5	15	"....., supplies, water.....	1,560
Vansee.....	58	15	8	Orders, sell fish.....	3,280
Venus.....	25	7	9	Sell fish.....	2,520
Venus.....	4	2	10	".....	1,180
Vera.....	4	2	1	".....	20
Vermont.....	35	8	1	Supplies, water.....	
Vesta.....	17	5	13	Sell fish.....	1,040
Viking.....	11	4	4	".....	160
Virginia.....	33	5	2	".....	420
Volunteer.....	20	5	2	Bait, sell fish.....	160
Wabash.....	6	3	15	Sell fish.....	920
Wanderlust.....	5	5	1	Shelter, water.....	
Washington.....	15	4	1	Sell fish.....	80
Wave.....	7	3	11	".....	720
Wesley.....	9	3	8	Bait, ice.....	
Western.....	41	7	10	Sell fish.....	2,420
Westford.....	17	5	3	Bait, ice, landed sick man, sell fish.....	40
Wilson.....	19	8	10	Bait, ice, sell fish, supplies, water.....	400
Wireless.....	19	5	14	Bait, ice, sell fish.....	320
Wizard.....	49	8	7	Sell fish.....	3,200
Woodrow.....	23	5	8	Bait.....	
Yakutat.....	41	14	13	Bait, ice, orders, sell fish, supplies, water.....	1,320
Yellowstone.....	22	5	14	Sell fish.....	1,520
Young America.....	27	6	2	".....	400
Yukon.....	31	6	7	".....	1,780
Yule.....	9	3	1	Supplies, water.....	
Zenith.....	47	9	8	Sell fish.....	1,520

## APPENDIX 7

The following is a statement of the different kinds of licenses issued by the different inspectors during the 1925-26 season:—

## MAGDALEN ISLANDS, QUEBEC—Inspector S. T. GALLANT

Kind of Licenses—	Number of Licenses Issued
Lobster fishing licenses.....	452
Lobster packing licenses.....	17
Lobster packing extensions—15.....	
Fish cannery licenses.....	1
Certificates under section 63—1.....	
Herring seine licenses.....	24
Herring trap-net licenses.....	23
	<hr/> 517

## PRINCE EDWARD ISLAND—Inspector S. T. GALLANT

Lobster fishing licenses.....	2,319
Lobster packing licenses.....	144 (1 cancelled)
Lobster packing extensions—76.....	
Oyster fishery licenses.....	175
Quahaug fishery licenses.....	Nil
Fish cannery licenses.....	11
Certificates under section 63—6.....	
Reduction works licenses.....	Nil
Trap-net fishing licenses.....	3
Smelt gill-net licenses.....	308
Smelt bag-net licenses.....	284 (1 cancelled)
Receipts books—22.....	
	<hr/> 3,244 (2 cancelled)

## NOVA SCOTIA—DISTRICT No. 1—Inspector A. G. McLEOD

Lobster fishing licenses.....	2,067
Lobster packing licenses.....	47
Lobster packing extensions—31.....	
Oyster fishery licenses.....	90
Fish cannery licenses.....	3
Certificates under section 63—61.....	
Reduction works licenses.....	Nil
Herring weir licenses.....	Nil
Special fishery licenses for trap-nets.....	54
Salmon gill-net or drift-net licenses.....	27
Salmon trap-net, pound-net or weir.....	145
Special angling permits.....	50
Receipt books—5.....	
Lobster pound licenses.....	Nil
Smelt gill-net licenses.....	217
Smelt bag-net licenses.....	40
	<hr/> 2,740

## NOVA SCOTIA—DISTRICT No. 2—Inspector D. H. SUTHERLAND

Lobster fishing licenses.....	2,792 (3 cancelled)
Lobster packing licenses.....	62
Lobster packing extensions—57 (2 cancelled).....	
Oyster fishery licenses.....	134
Shad gill-net or drift-net licenses.....	20
Fish cannery licenses.....	2
Certificates under section 63—107 (2 cancelled).....	
Reduction works licenses.....	2
Seine licenses.....	183
Herring weir licenses.....	18
Trap-net licenses.....	139
Salmon gill-net or drift-net licenses.....	320
Salmon trap-net, pound-net or weir licenses.....	151 (2 cancelled)
Special angling permits.....	48
Receipt books—24 (2 cancelled).....	
Smelt gill-net licenses.....	260
Smelt bag-net licenses.....	242
Scallop fishery licenses.....	8
Lobster pound licenses.....	2
Lobster pound certificates—103.....	
	<hr/> 4,388 (5 cancelled)

## NOVA SCOTIA—DISTRICT No. 3—Inspector H. H. MARSHALL

Kind of Licenses—Continued	Number of Licenses Issued
Lobster fishing licenses.....	3,133
Lobster packing licenses.....	27
Lobster packing extensions—34.....	
Shad gill-net or drift-net licenses.....	2
Fish cannery licenses.....	9
Certificates under section 63—163.....	
Reduction Works licenses.....	1
Herring weir licenses.....	81
Trap-net fishing licenses.....	159
Salmon gill-net or drift-net licenses.....	254 (9 cancelled)
Salmon trap-net, pound-net or weir licenses.....	64
Salmon net permits.....	251 (1 cancelled)
Special angling permits.....	463
Lobster pound licenses.....	7
Receipt books—13.....	
Lobster pound certificates—152 (1 destroyed).....	
Smelt gill-net licenses.....	62
Smelt bag-net licenses.....	37
Scallop fishery licenses.....	225
	<b>14,549 (10 cancelled)</b>

## NEW BRUNSWICK—DISTRICT No. 3—Inspector H. E. HARRISON

Shad gill-net or drift-net licenses.....	230
Sturgeon fishery licenses.....	10
Whitefish fishery licenses.....	1
Salmon net permits.....	150
Salmon gill-net or drift-net licenses.....	127
Receipt books—7.....	
Smelt gill-net licenses.....	Nil
Smelt bag-net licenses.....	Nil
Bass fishery licenses.....	90
	<b>608</b>

## NEW BRUNSWICK—DISTRICT No. 1—Inspector J. F. CALDER

Lobster fishing licenses.....	637
Shad gill-net or drift-net licenses.....	46
Fish cannery licenses.....	8
Certificates under section 63—5.....	
Reduction works licenses.....	Nil
Herring weir licenses.....	608 (1 cancelled)
Clam permits.....	112
Salmon gill-net or drift-net licenses.....	81
Herring seine licenses.....	1
Receipts books—112.....	
Smelt gill-net licenses.....	Nil
Smelt bag-net licenses.....	Nil
Scallop fishery licenses.....	39
Lobster pound licenses.....	3
Lobster pound certificates—59.....	
Lease of Dark Harbour.....	
Fishing privileges—1.....	
	<b>1,535 (1 cancelled)</b>

## NEW BRUNSWICK—DISTRICT No. 2—Inspector A. L. BARRY

Lobster fishing licenses.....	2,211
Lobster packing licenses.....	137
Lobster packing extensions—59.....	
Oyster fishery licenses.....	609
Quahaug fishery licenses.....	128
Shad gill-net or drift-net licenses.....	22
Fish cannery licenses.....	5
Certificates under section 63—209 (1 cancelled).....	
Reduction works licenses.....	Nil
Herring weir licenses.....	2
Salmon net permits.....	34
Gaspereau pound-net or trap-net licenses.....	53
Salmon gill-net or drift-net licenses.....	53
Smelt gill-net licenses.....	144
Smelt bag-net licenses.....	4,896
Scallop fishery licenses.....	Nil
Lobster pound licenses.....	5
Bass fishery licenses.....	63
Lobster pound certificates—173.....	
Receipt books—72.....	
Salmon trap-net, pound-net or weir licenses.....	450
	<b>8,812</b>

## MANITOBA—Inspector J. B. SKAPTASON

Kind of Licenses—Continued	Number of Licenses Issued
Commercial sturgeon fishery licenses.....	194 (1 cancelled)
Domestic sturgeon fishery licenses.....	103
Special angling permits (non-residents).....	250
Pound-net licenses.....	22
Receipts book—275.....	
Special fishery licenses.....	2,810 (7 cancelled)
Settler's permits.....	971
	<hr/> 4,350 (8 cancelled)

## SASKATCHEWAN—Inspector G. C. MACDONALD

Commercial sturgeon fishery licenses.....	1
Domestic sturgeon fishery licenses.....	8
Special angling permits.....	495 (2 cancelled)
Receipt books—14.....	
Commercial and fisherman's licenses.....	758
Domestic fishery licenses.....	137
Indian and half-breed permits.....	828
	<hr/> 2,227 (2 cancelled)

## ALBERTA—Inspector R. T. RODD

Fish cannery licenses.....	Nil
Special angling permits.....	4,611 (3 cancelled)
Receipt books—589 (2 cancelled).....	
Indian and half-breed permits.....	844
Commercial and fisherman's fishery licenses.....	1,008 (4 cancelled)
Domestic fishery licenses.....	147 (12 cancelled)
	<hr/> 6,610 (19 cancelled)

## BRITISH COLUMBIA

Fish cannery licenses.....	11
Certificates under section 63—Nil.....	
Special angling permits.....	20
Abalone fishery licenses.....	1
Indian permits.....	122
Metal tags.....	1,589
Reduction works licenses.....	20
Crab fishery licenses.....	131 (1 cancelled)
Smelt or sardine fishery licenses.....	51
Sturgeon fishery licenses.....	1
Miscellaneous licenses.....	161
Salmon fishery licenses.....	3,888 (1 cancelled)
Salmon trolling licenses.....	1,807 (4 cancelled)
Salmon trap-net.....	20 (1 cancelled)
Salmon drag-seine licenses.....	38 (1 cancelled)
Salmon purse-seine licenses.....	303
License to Capt. of Salmon (purse or drag) seine boat.....	228 (6 cancelled)
Salmon curing licenses.....	67 (2 cancelled)
Salmon cannery licenses.....	68 (1 cancelled)
Boat licenses.....	218 (1 cancelled)
Fish buyer's licenses.....	62 (1 cancelled)
Grayfish licenses.....	166 (1 cancelled)
License to assistant operator of salmon (purse or drag) seine under license No.....	1,294
License to assistant in a boat used in operating salmon gill-net or drift-net.....	1,067 (4 cancelled)
Cod fishery licenses.....	373 (1 cancelled)
Herring or pilchard gill-net or drift-net.....	31
Herring drag-seine licenses.....	4
Herring purse seine licenses.....	54 (1 cancelled)
(No. 16 Pilchard purse Seine)	
License to Capt. of herring seine boat.....	45
Herring curing licenses.....	31
Whale factory licenses.....	2
Counterfoil of pelagic sealing.....	
Certificates.....	10
	<hr/> 10,294 (26 cancelled)

## YUKON TERRITORY

Special fishery licenses.....	24 (1 cancelled)
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## MODUS VIVENDI LICENSES

Pacific Coast.....	216
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Total.....50,114 (74 cancelled)

Number of Pages: 1  
Date: 10/1/54

1. Title: .....  
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17. Date: 10/1/54

DOMINION OF CANADA

SIXTIETH  
ANNUAL REPORT

OF THE

# FISHERIES BRANCH

Department of Marine and Fisheries

---

FOR THE YEAR  
1926-27



OTTAWA  
F. A. ACLAND  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
1927

Price, 25 cents



Canada. Dept. of Fisheries

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FOR THE YEAR

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OTTAWA  
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1927



To His Excellency the Right Honourable Viscount Willingdon, G.C.S.I.,  
G.C.M.G., G.C.I.E., G.B.E., Governor General and Commander in Chief  
of the Dominion of Canada.

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of your Excellency and the Parliament of Canada, the Sixtieth Annual Report of the Fisheries Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

P. J. ARTHUR CARDIN,  
*Minister of Marine and Fisheries.*

DEPARTMENT OF MARINE AND FISHERIES,  
OTTAWA, August, 1927.

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## DEPUTY MINISTER'S REPORT

To the Hon. P. J. A. CARDIN,  
Minister of Marine and Fisheries.

SIR,—I have the honour to submit the Sixtieth Annual Report of the Fisheries Branch of the Department, which is for the fiscal year ended March 31, 1927.

The report deals with the following subjects:—

- Review of the Fisheries of 1926.
- Operation of the Fish Inspection Act.
- The Inspection of Canneries and Canned Fish.
- Fisheries Intelligence Service.
- Fishing Bounty.
- Fish Culture.
- North American Committee on Fisheries Investigation.
- International Fisheries Commission.
- Marine Biological Board.
- Oyster and Scallop Investigations.

Appendices to the report include the following:—

- Report of Inspectors of Fisheries.
- Report on Activities of Marine Biological Board.
- Report on Oyster and Scallop Investigations.
- Fishways and Removal of Obstructions.
- Fisheries Expenditure and Revenue.
- Entries of United States Fishing Vessels.
- Summary of Licenses Issued.

### REVIEW OF THE FISHERIES OF 1926

The production of fish and fish products during the year under review was considerably greater than during 1925, while the marketed value was greater by some \$8,418,502, the value being \$56,360,633. The latter value has only been exceeded twice in the history of the industry, and then during the war years when prices were much higher than at present.

The following table shows the marketed value by provinces, as compared with the years 1925 and 1924:—

	1926	1925	1924
	\$	\$	\$
Nova Scotia.....	12,505,922	10,213,687	8,777,251
New Brunswick.....	5,325,478	4,798,589	5,383,286
Prince Edward Island.....	1,358,934	1,598,119	1,201,772
Quebec.....	3,110,964	3,044,919	2,283,314
Ontario.....	3,152,193	3,436,412	3,557,587
Manitoba.....	2,328,803	1,466,939	1,232,563
Saskatchewan.....	444,288	479,645	482,492
Alberta.....	749,026	458,504	339,107
British Columbia.....	27,367,109	22,414,618	21,257,567
Yukon Territory.....	17,866	15,370	18,773
	56,360,633	47,926,802	44,534,235

The province of Nova Scotia shows an increase in value of over two and a quarter million dollars. The fisheries of this province expanded remarkably during the year, due to increased demands, both in Canada and abroad, especially in the fresh fish industry. During the summer months there was an increase in the catch of over 50,000,000 pounds. Fifteen new vessels were built for the industry during the year.

There were increases in the catch of haddock, pollock, herring, sardines, alewives, smelts and tom cod in the province of New Brunswick, which accounts for the increase in value.

The province of Prince Edward Island recorded a decrease in the value of the fisheries. This was due to lower catches of cod, smelts and lobsters, three of the chief fisheries of the province.

In the province of Quebec the value and production was about the same as in the previous year. Smaller catches of cod and mackerel were offset by slightly higher catches of herring, salmon and lobsters.

The province of Ontario shows a drop in the value with decreases in the production of whitefish, pickerel and pike.

There was a splendid increase in production in the province of Manitoba, practically all kinds of fish being taken in larger quantities. Saskatchewan reports a slight decrease, while in Alberta the production and value were higher.

In the Pacific Division, which comprises the province of British Columbia, there was an increase in the production of salmon, which mainly accounts for an increase of nearly five million dollars in the value of the fisheries of that division.

#### ATLANTIC COAST

*Cod, Haddock, Hake and Pollock.*—The catch of these kinds was 3,425,544 cwts. This is an increase over the catch of 1925 of 553,213 cwts. Each kind shows an increase in the province of Nova Scotia, with cod showing an increase of over 450,000 cwts. The catches of haddock and pollock were greater in New Brunswick, while there were decreases recorded in the other two varieties. Prince Edward Island and Quebec showed decreases in the catch of both cod and hake. Of the total catch there were 439,281 cwts. used fresh (including fresh fillets). This is an increase of 127,923 cwts. over the quantity sold in the same manner in the previous year. There were 151,357 cwts. of smoked (including smoked fillets) prepared, as compared with 103,116 cwts. in 1925.

The Lunenburg banking fleet landed some 372,000 qts. of cod. The fleet during 1926 comprised 92 vessels, which was 12 more than in 1925. The price received for their product was considerably less than for the 1925 catch.

Eleven steam trawlers operated out of Nova Scotian ports during the year.

*Mackerel, Herring and Sardines.*—There were 1,531,399 cwts. of these fish landed, compared with 1,428,155 cwts. during 1925, or an increase of 103,244 cwts.

The catch of herring in Nova Scotia was some 58,000 cwts. greater than the year before. The catch was about the same in Prince Edward Island, while in New Brunswick and Quebec there were increases of 50,000 cwts. and 39,000 cwts. respectively. The quantity of herring smoked was 133,163 cwts., which was an increase of 43,219 cwts.

The catch of mackerel was only 115,487 cwts., compared with 187,661 in 1925. Owing to the condition of the American market, which was practically glutted with these fish, the demand for mackerel was small and, therefore, the fishery was prosecuted only in an indifferent manner.

There were 173,166 barrels of sardines taken, compared with 158,533 barrels during the previous year. These fish were very plentiful but the demand, which

comes mainly from the American canneries, was very limited. Consequently not nearly as many were taken as might have been. The pack of these fish locally was the largest in the history of the industry.

*Other Sea Fish.*—The catch of halibut was 24,823 cwts., which is an increase of 3,000 cwts. over the previous year. There were 12,935 cwts. of swordfish taken, which is nearly three times the quantity taken in 1925. The catch of tom cod was 20,239 cwts. and of flounders 15,798 cwts., both an increase over the previous year.

*Shellfish.*—There were 339,583 cwts. of lobsters taken, which is a slight decrease of 1,255 cwts. The catch and its disposal by provinces, as compared with the same period for the year 1925, was as follows:—

	Catch	Marketed Shell	Canned
	Cwts.	Cwts.	Cases
<b>1926</b>			
Nova Scotia.....	184,316	71,443	56,277
New Brunswick.....	59,611	15,861	24,041
Prince Edward Island.....	66,298	3,153	29,442
Quebec.....	29,358	847	13,759
<b>1925</b>			
Nova Scotia.....	170,698	63,525	53,745
New Brunswick.....	65,894	10,991	27,236
Prince Edward Island.....	78,570	10,272	34,121
Quebec.....	25,676	1,313	12,395

There were 19,898 barrels of oysters taken, compared with 19,960 barrels in 1925.

The quantity of clams and quahaugs dug was 41,417 barrels, which was an increase of 12,958 barrels. Scallops also show an increase, there being some 23,200 barrels taken compared with 17,718 barrels.

*River Spawning Fish.*—There were 52,795 cwts. of salmon taken, which is a slight drop from the previous year.

Some 90,481 cwts. of smelts were taken, compared with 75,457 cwts. in 1925. Of the total catch for 1926 New Brunswick contributed 59,400 cwts., which was an increase of nearly 13,000 cwts.

The catch of alewives again shows a big increase, some 71,479 cwts. being landed while in 1925 there were only 56,781 cwts. The quantity landed in Nova Scotia was less, while in New Brunswick there was a large increase. About half of the catch was salted.

#### INLAND FISHERIES

There was an increase in the catch of whitefish of 3,964 cwts., some 190,644 cwts. being landed. This is the largest catch of whitefish recorded since the year 1919. Manitoba shows an increase of some 16,000 cwts., and is accounted for largely in Lake Winnipeg where the whitefish were more plentiful than for some years. There were 126,086 cwts. of pickerel, 30,385 cwts. of blue pickerel and 72,520 cwts. of pike taken, compared with 86,877 cwts., 34,453 cwts. and 54,217 cwts. respectively during 1925. Ontario showed a decrease in the catch of all three kinds, Manitoba recorded an increased catch of nearly double the quantity of pickerel and pike taken during 1925. The

catch of pickerel and pike in Saskatchewan was slightly greater, while in Alberta it was considerably greater.

From the Great Lakes' waters in Ontario there were taken 44,122 cwts., of fresh water herring or ciscoes. This is a decrease of 1,433 cwts. from the catch of 1925.

The provinces of Manitoba and Alberta showed substantial increases in production, while the catches in Saskatchewan and Ontario fell off somewhat.

#### PACIFIC COAST

The marketed value of the fisheries shows a large increase over that of the previous year amounting to nearly five million dollars. The increase was chiefly due to the larger pack of salmon with an increase in value of nearly four million dollars. The halibut and pilchard fishery were responsible for the remainder of the increase, although the catch of halibut was slightly less than in the previous season.

*Salmon.*—There were 2,125,555 cwts. landed, compared with 1,873,376 cwts. in 1925 or an increase of 252,179 cwts. The number of cases canned was 2,065,185 compared with 1,720,622 in 1925. The total marketed value of the salmon catch was \$18,776,762 compared with \$14,973,885. The latter value was about two million dollars greater than the value in 1924.

The pack this year was a record one and was due to the increased demand for the fall varieties, viz., pinks and chums. The number of cases of sockeye canned was 336,995 which is an average one. The pack of these fish on the Fraser river was larger than usual owing to a late run occurring during the last of September and the first of October. The pack of cohoes was fair while that of pinks was a record one of 772,992 cases. Likewise the pack of chums, 701,971 cases, was a record one.

*Halibut.*—There were 315,095 cwts. of halibut landed, a decrease of 3,145 cwts. from the catch of 1925. The drop was chiefly in the landings made by American vessels.

*Herring.*—The catch was 1,301,269 cwts. which was a decrease of over 100,000 cwts. from the catch of the previous year. There were dry salted 938,647 cwts. this being the second largest pack on record but still some 144,000 cwts. less than the record.

*Pilchards.*—The catch of these fish was more than treble that of 1925, there being some 969,958 cwts. landed. The great bulk was used in the manufacture of meal and oil. There were 7,948 tons of meal produced and 1,898,721 gallons of oil. The greater part of the oil is shipped to the United States and Great Britain, but the meal is sent chiefly to Japan.

*Whales and Seals.*—Two whaling stations were in operation during the year, both on the Queen Charlotte islands. The number of whales taken was 269.

The number of fur seals taken by Indians under the Pelagic Sealing Treaty was 2,824.

#### INSPECTION OF FISH

The inspection of certain kinds of fish, and the packages in which they are marketed, is carried on under authority of the Fish Inspection Act. The Act makes it necessary for packers to have both fish and barrels in accordance with its requirements and empowers Inspectors to examine such whenever and wherever it is necessary and convenient.

On the Atlantic coast during the year there were inspected 44,685 packages of various kinds containing salted herring, mackerel, alewives and salmon.

There were also inspected 68,648 boxes of smoked herring which were prepared for export. In addition to these 56,146 empty barrels were examined and 1,296 empty pails to ascertain whether they were up to the standard required by the Act before they passed into the hands of the packers.

On the Pacific coast the large and very important trade in dry salted herring between British Columbia and China was supervised by the department's inspectors. Provided the container is of standard size and filled to capacity with fish that are properly cured a certificate to that effect is issued by the inspector to the shipper of each shipment and the inspection system is now so satisfactory to shippers that they would not think of making a shipment without the official certificate. During the year under review 190,365 boxes of dry salted herring, each containing four hundred pounds, were inspected.

Under this system of inspection the quality of the cured articles on both coasts is being rapidly improved. The greatest and probably the most important improvement of all is in the quality and strength of the barrels that are now being made all over the Atlantic coast, which alone would seem to justify the institution of our inspection system.

#### INSPECTION OF CANNERIES AND CANNED FISH

The inspection of fish canneries of all kinds throughout Canada, the raw material to be used therein and the process of canning the product and the labelling and marking of the cans was carried on during the year 1925-26 as previously under the provisions of the Meat and Canned Foods Act. This inspection is carried on by the department's staff of fishery overseers as part of their regular duties. There are between six and seven hundred canneries, large and small, canning fish of various kinds on the Atlantic and Pacific coasts. As a result of the inspection that has been conducted for several years there is a marked improvement not only in the conditions under which canning operations are carried on from the sanitary point of view but in the quality of the canned product as well. Defective buildings and equipment are being constantly rectified and improved at the instigation of the inspecting officers.

#### FISHERIES INTELLIGENCE SERVICE

Under this service there was carried on during the season of 1926:—

1. The collection of monthly statistics of the sea fisheries, and the compilation of such in a summarized form for publication through the press each month.
2. The publication of a quarterly bulletin containing the statistics in detail. The bulletin is distributed to the trade and all directly concerned. The statistics are practically all collected by the regular fishery officers while performing their other duties as such and at very little additional cost.
3. The collection of information concerning supplies of bait day by day along certain stretches of the coast during the spring and summer months. The information is gathered by the officers of the department, who send it by telegram daily to certain ports where it is posted up for information of masters of fishing vessels and those looking for bait.

#### FISHING BOUNTY

Under the authority of "An act to encourage the development of the Sea Fisheries and the Building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the Governor in Council. It is distributed under the name of Fishing Bounty, by the Department of Marine and Fisheries amongst

fishermen, and fishing vessel and boat owners on the Atlantic coast under regulations made from time to time by the Governor in Council.

For the year 1926, payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton, payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$7.50 each.

To owners of boats measuring not less than 13 feet keel, \$1 per boat.

To boat fishermen entitled to receive bounty, \$5.60 each.

There were 11,036 bounty claims paid. In the preceding year there were 9,979 bounty claims paid.

The total amount paid was \$159,768.10 allocated as follows:—

To 582 vessels and their crew... ..\$ 46,340 60

To 10,454 boats and their crew... ..\$113,427 50

#### FISHING BOUNTY EXPENDITURE FOR 1926-27

County	Boats	Men	Amount	Vessels	Tons	Avg. Tons	Men	Amount	Total Amount
<i>Nova Scotia</i>			\$ cts.					\$ cts.	\$ cts.
Annapolis.....	181	286	1,794 50	1	14	14	2	29 00	1,823 50
Antigonish.....	114	164	1,032 40						1,032 40
Cape Breton.....	291	526	3,441 80	29	439	15	118	1,338 00	4,779 80
Cumberland.....	3	4	26 10						26 10
Digby.....	344	562	3,507 60						3,507 60
Guysboro.....	515	826	5,159 50	59	961	16	276	3,039 50	8,199 00
Halifax.....	1,020	1,345	8,580 10	77	1,169	15	324	3,602 50	12,182 60
Inverness.....	250	500	3,061 90	8	107	13	38	394 00	3,455 90
Kings.....	37	60	378 60						378 60
Lunenburg.....	497	580	3,755 50	153	8,060	52	2,056	23,487 30	27,242 80
Pictou.....	20	26	163 40						163 40
Queens.....	174	275	1,714 70	15	262	17	93	964 00	2,678 70
Richmond.....	341	614	3,784 30	9	139	15	34	394 50	4,178 80
Shelburne.....	502	914	5,627 40	18	485	27	145	1,572 50	7,199 90
Victoria.....	257	373	2,348 60	5	73	15	14	179 50	2,528 10
Yarmouth.....	121	280	1,689 70	9	515	57	188	1,935 00	3,624 70
Total.....	4,667	7,335	46,071 10	383	12,224	32	3,288	36,935 80	83,006 90
<i>New Brunswick</i>									
Charlotte.....	269	456	2,840 10						2,840 10
Gloucester.....	277	687	4,167 20	171	2,786	16	759	8,483 40	12,650 60
Kent.....	65	119	732 00	7	76	11	8	136 50	868 50
Northumberland.....									
Restigouche.....	1	3	18 50	3	30	10	9	100 50	119 00
St. John.....	30	38	242 80						242 80
Total.....	642	1,303	8,000 60	181	2,892	16	776	8,720 40	16,721 00
<i>Prince Edward Island</i>									
Kings.....	530	810	5,118 50	1	22	22	1	30 00	5,148 50
Prince.....	500	936	5,986 15	4	55	14	8	119 90	6,106 05
Queens.....	143	303	1,865 00	4	48	12	8	102 00	1,967 00
Total.....	1,173	2,049	12,969 65	9	125	14	17	251 90	13,221 55
<i>Quebec</i>									
Bonaventure.....	596	950	6,043 10	2	23	11	8	83 00	6,126 10
Gaspé.....	2,519	5,028	30,864 15	7	102	74	33	349 50	31,213 65
Saguenay.....	751	1,382	8,509 80						8,509 80
Matane.....	106	153	969 10						969 10
Total.....	3,972	7,513	46,386 15	9	125	14	41	432 50	46,818 65
Grand total..	10,454	18,200	113,427 50	582	15,366	26	4,122	46,340 60	159,768 10

## FISH CULTURE

The more important fresh-water and anadromous food fishes, such as Atlantic salmon in the east, whitefish, salmon trout and pickerel in the interior, and Pacific salmons in the west were given first consideration in the fish cultural operations of the department during the calendar year 1926, but in response to a constantly increasing public demand, greater attention was paid to game fish, and the distribution of game trout was approximately the same as in the previous year which was greater than ever before.

Satisfactory progress was made in the development of the rearing ponds and brood stock of trout at the St. John hatchery, New Brunswick, which produced over two million, six hundred thousand eggs during the year. With the increased demand for assistance from areas that are beginning to feel the need of restocking, the necessity for increased facilities for retaining and feeding fry so as to afford a longer season for distribution is becoming more apparent every year.

The total distribution from all hatcheries was greater by over fourteen and one-half million than it was in 1925. The distributions of sockeye salmon and whitefish were larger by approximately two and one-half and forty-three million respectively, and the distributions of Atlantic salmon, cisco and pickerel were smaller by approximately three, ten and fifteen and one-half million respectively, than they were in the previous year, with minor variations in the other species.

In addition to the distributions that were made from the hatcheries, twenty-five lakes received allotments of fry or older fish from other bodies of water. This work was largely confined to the western provinces where there are many districts that are not readily accessible to existing hatcheries. It involved the capture, and transfer in many instances for a considerable distance, of sixty-eight thousand three hundred and sixty-two fish, comprising nine different species.

The seeding of remote and isolated waters (to which it is not feasible to transfer fry from existing hatcheries) was continued in British Columbia and fifteen million, eight hundred and twenty-four thousand, five hundred sockeye salmon eggs, collected in the Pemberton district below Hell's Gate, and in the Lakelse district (the Lakelse eggs were replaced from Pemberton) were planted in the one-time spawning beds of such important sockeye areas as Stuart, Francois, Bowron, Quesnel, Shuswap and Anderson lakes in the Upper Fraser above Hell's Gate.

Examinations and inspections were made in the different provinces with a view to locating waters where trout eggs might be obtained for hatchery purposes, and with a view to locating sites where the fish cultural service might be advantageously extended by the construction of new establishments in districts that are difficult to cover from existing hatcheries.

As opportunity offered, the general inspection of waters throughout the country, which was initiated a few years ago, was continued by the officers and employees of the fish cultural and fishery services.

The Canadian National Railway, Canadian Pacific Railway, Dominion Atlantic Railway, Fredericton and Grand Lake Coal and Railway Company and the New Brunswick Coal and Railway, Esquimalt and Nanaimo Railway, Kettle Valley Railway and the Pacific Great Eastern Railway continued their assistance and co-operation of the previous year by most generously furnishing free transportation for shipments of game fish and game fish eggs with their attendants. A similar courtesy was recently extended by the Cumber-

land Railway and Coal Company. The extent of this co-operation is indicated by the following summary:—

	Total mileage on trip passes	Number of passages	Mileage baggage car permit			Number Cases or cans			Number of permits
			Full	Empty	Total	Full	Empty	Total	
C.N.R.....	25,811	249	13,465	16,000	29,465	1,020	986	2,006	228
C.P.R.....	12,827	96	7,438	6,634	14,072	382	358	740	119
F. & G.L.C. & R. Co. & N.B.C. & R.....	90	2	45	45	90	10	10	20	2
P.G.E.....	694	8	347	347	694	4	4	8	8
E. & N.....	1,024	20	473	419	892	57	61	118	17
D.A.R.....	2,509	23	1,255	991	2,246	138	121	259	23
	42,955	398	23,023	24,436	47,459	1,611	1,540	3,151	397

NOTE.—Number of passages refers to transportation one way. A return trip counts as two passages. Number of permits refers to one way passage for cases or cans, either by permit, special authority or free transportation without a permit form.

The department also participated with assortments of hatchery products and equipment in several exhibits for portraying the natural resources of the country. These exhibits were of considerable educational value and attracted great interest.

The transfer of the hatcheries previously operated by this department, to the province of Ontario, which was referred to in the last report, became effective on June 30, 1926, and the permanent staffs employed therein were retired or superannuated under the provisions of the Superannuation Act of 1924.

Most gratifying reports are received from all districts where fish cultural operations are carried on in a systematic way. The return of sockeye to the Fraser river watershed was the largest for many years and the commercial catch exceeded all expectations. A record was attained in the collection of Fraser river sockeye eggs which was eleven million in excess of that of last year and over sixty-three per cent in excess of the collection of 1922, the corresponding year in the four year cycle that obtains in the Fraser. The run to the Pemberton district was considerably larger than that of 1925, and all previous collections of eggs were exceeded with a take of forty-five million. A most unexpected run made its appearance late in October in Adams river, tributary to Big Shuswap lake, and in Little River which connects Big and Little Shuswap lakes. It was conservatively estimated that at least one-half million sockeye salmon spawned in these streams. The local fishery officers kept all the tributaries to these lakes under close observation during the spawning season and their evidence is to the effect that no sockeye spawned in any of the streams in this district except the two above mentioned. Nothing approximating this run of 1926 has been seen in this region since before the Hell's Gate disaster of 1913. A record collection was also made at Rivers Inlet and the streams at the extreme head of Owikeno lake, in which the runs were almost extinct a few years ago, were abundantly seeded. All previous collections of sockeye eggs were also exceeded at Lakelse lake on the Skeena, and conditions generally at the several hatcheries on Vancouver island were most promising.

Up to June 30, 1926, when eight hatcheries were transferred to the province of Ontario, the department operated thirty-two main hatcheries, six subsidiary hatcheries, four salmon retaining ponds, one eyeing station and several egg collecting stations. The output from these establishments during 1926

was seven hundred and twenty-one million, nine hundred and eighty-two thousand, eight hundred and eight, as shown by species in the following statement:—

STATEMENT, BY SPECIES, OF THE FISH AND FISH EGGS DISTRIBUTED FROM THE HATCHERIES DURING THE YEAR ENDED DECEMBER 31, 1926

Species	Green eggs	Eyed eggs	Fry	Advanced fry	Fingerlings	Yearlings and older fish	Total distribution
<i>Salmo salar</i> —Atlantic salmon.....		440,000	4,797,750	8,494,800	7,909,616	11	21,642,207
<i>Salmo salar</i> <i>sebago</i> —Landlocked salmon.....		25,250		62,035			87,285
<i>Salmo trideus</i> —Rainbow trout.....			342,700	139,917	67,863	763	551,243
<i>Salmo clarkii</i> —Cutthroat trout.....		216,250	655,190	293,750	166,890		1,332,080
<i>Salmo gairdneri</i> —Steelhead salmon.....			222,804				222,804
<i>Salmo gairdneri</i> <i>kamloops</i> —Kamloops trout.....		1,581,000	351,509				1,932,509
<i>Salmo trutta leucomaenis</i> —Loch leven trout.....			336,000			714	546,714
<i>Salmo trutta</i> —Brown trout.....				210,000	164,295		211,214
<i>Oncorhynchus nerka</i> —Sockeye salmon.....	1,500	39,423,400	57,305,668		5,029,361	3,854	101,763,783
<i>Oncorhynchus tshawytscha</i> —Spring salmon.....			463,800		221,527		685,327
<i>Oncorhynchus kisutch</i> —Coho salmon.....		793,170					793,170
<i>Oncorhynchus gorbuscha</i> —Pink salmon.....					25		25
<i>Oncorhynchus keta</i> —Chum salmon.....						40	40
<i>Salvelinus fontinalis</i> —Speckled trout.....		535,250	417,127	578,500	2,548,226	3,849	4,132,952
<i>Coregonus clupeaformis</i> —Whitefish.....			478,521,750				478,521,750
<i>Cristiomer namaycush</i> —Salmon trout.....			11,183,290	1,580,000	5,399,415		18,162,705
<i>Argyrosomus arcti</i> —Cisco.....			1,362,000				1,362,000
<i>Stizostedion vitreum</i> —Pickerel.....		1,380,000	88,655,000				90,035,000
	1,500	44,444,320	644,614,618	11,523,297	21,389,842	9,231	721,982,808

Full particulars regarding the extent and scope of this service appear in the Annual Report on Fish Culture for 1926.

#### NORTH AMERICAN COMMITTEE ON FISHERY INVESTIGATIONS

Meetings have been held as follows: On July 9, 1926, at St. John's, Newfoundland, and on April 28, 1927, at Washington, D.C.

The fisheries statistics of the various countries fishing the banks of the northwestern Atlantic are being correlated, so as to make it possible to follow the full fishery of the banks of that region. Mr. O. E. Sette of the United States Bureau of Fisheries has prepared from all the available statistics a summary of the total annual catches of cod of the region, as taken by Newfoundland, France, Portugal, Canada, and the United States during the past forty years or more. This summary shows that the cod fishery has furnished annually around a billion pounds of fish, ranging from eight hundred and fifty million pounds to one billion three hundred and fifty million pounds. Although there have been considerable fluctuations, these have been upward as much as downward, so that there is no evidence of any definite decline in the fishery or of any depletion of the stock.

The codfish has been a particular object of investigation for this committee. Mr. W. C. Schroeder has been studying the cod of the coast of the United States, and has found that fish living in the summer off cape Cod migrate to the New Jersey coast during the winter and return in the spring. In the winter of 1926 this migration was smaller than in previous winters. In the fall of 1925 and during 1926 smaller fish than previously appeared off cape Cod and predominated in the catches. Correspondingly the fish of the winter of 1926 off the New Jersey coast were reported as smaller than usual. Fish tagged at Mount Desert, Maine, have been found to move chiefly eastward to both coasts of Nova Scotia,

only an occasional one moving westward and reaching as far as cape Cod. Fish tagged on Georges bank in 1926 have yielded only one return so far, and that on the same bank, showing no distant movement whatever.

Mr. G. L. Duff has studied the growth of the cod in Canadian waters, finding in particular that the scales do not grow similarly to the whole fish throughout the year, but grow relatively more rapidly at one time and relatively less rapidly at another. Cod have been tagged, 275 off Halifax, N.S., in 1925, and 3,747 off Shelburne, N.S., in 1926. Of the former lot more were recaptured in the following year than during the year in which they were tagged. They were retaken only along the coast and at no great distance, going more to the southwestward (nearly to Liverpool, N.S.) in the second year. The Shelburne cod showed very little movement, and that chiefly to the eastward, going as far as Liverpool, N.S., during the season, but reaching farther eastward to Halifax during the succeeding winter.

The haddock of the Canadian coast have been under investigation. Dr. Huntsman and Mr. A. W. H. Needler have found that the haddock population of the Bay of Fundy, particularly of the New Brunswick shore, failed to receive any considerable number of young for a series of years, with a resultant decline in the fishery. Then the young came in suddenly and in a year or two the fishery greatly increased and has continued at a high level. Mr. Needler has found that the haddock grows more rapidly in the early years of its life in the warm waters of Passamaquoddy bay, New Brunswick, than in the cold waters on the outer coast of Nova Scotia near Lockeport, but this rapid growth falls off more rapidly in later years in the warm water than in the cold. He has found that the rapid growth of the year is limited to the months from August to October. Two thousand five hundred and forty haddock were tagged near Shelburne, N.S., in 1926. They showed very little movement southwestward along the coast, but considerable movement northeastward, as far as Halifax and Sable Island bank, twice as far as the cod tagged simultaneously with the haddock.

The Canadian investigations of the mackerel have shown that its spawning in the Bay of Fundy is negligible in amount and without success in producing fry, and on the outer coast of Nova Scotia the eggs fail to develop into fry. In the gulf of St. Lawrence, however, spawning is extensive and very successful. Late in the summer the fry are to be found passing out of the gulf around Cape Breton island. The eggs have been found to require warm water for successful development. Dr. P. Cox has been studying the mackerel of the Canadian coast, and finds evidence of differences between those of southwestern Nova Scotia and those of the gulf of St. Lawrence. In 1925 and 1926, two thousand three hundred and eighty-two mackerel were tagged in Canadian waters. The returns from those tagged at Yarmouth show movement northeastward to the Gut of Canso, northward into the Bay of Fundy, and westward to the coast of Maine. Fish tagged at the Magdalen islands in 1925 showed movement to Prince Edward island the same season, and the next year some of them returned to the coast near Halifax and in Massachusetts.

In the United States Mr. O. E. Sette has found that mackerel tagged in 1925 at various points from Buzzards bay, Mass., to Casco bay, Maine, spread in both directions along the coast from the point of tagging, but did not migrate far. The following year those recaptured were taken on the whole to the southwest along the coast from where they had been tagged the previous year, one tagged on the coast of Maine being taken at Fire island, N.Y. Mackerel tagged off Delaware and Maryland in 1926 gave one recapture several months later near cape Cod. Mackerel apparently spawned in the year 1923 have furnished a vast proportion of the commercial catches made on the New England coast in

1926, although the "1921" year class would seem to have contributed fair numbers in the autumn. Extensive spawning was observed in Massachusetts bay in 1926, where very large numbers of the eggs and fry were obtained.

#### INTERNATIONAL FISHERIES COMMISSION

This commission is entrusted, under the provisions of the North Pacific Halibut Treaty between Canada and the United States, with making a thorough investigation into the life history of the Pacific halibut as well as recommendations to the two Governments as to the regulation of the fishery in the North Pacific, including Behring sea, which may seem desirable for the preservation and development of the fishery. The treaty provides for an annual close season of three months—from November 16 in each year to February 15 following, both days inclusive—but upon the recommendation of the commission this close season may be modified or suspended at any time after three such seasons. The treaty became effective on November 1, 1924, and the commission began its work very shortly thereafter. Hence it is expected to submit its first report to the two Governments during the approaching year.

The task with which the commission is charged is one of great magnitude and involves very great and peculiar difficulties. The fishery extends from the coast of Washington, northward and westward to and including Bering sea. The commission has, however, been carrying out the investigation with energy and despatch, and it explains that notwithstanding some serious setbacks the work has so far progressed as anticipated.

Though the investigation must be highly scientific in method, the commission has insisted from the outset that it be carried out along practical lines with close adherence to facts and the avoidance of unsupported theory or speculation. Its aim is to determine beyond any doubt the actual condition of the fishery at present and its trend to such condition from the start, the nature of the remedial measures that should be applied to save the fishery and build it up and the conditions that must be met in applying such measures.

A wealth of statistical information has been gathered. This shows conclusively a general decline in the abundance of fish on all areas but especially on the more southern ones which have been fished for the longest period. For instance, in Hecate strait the average annual catch per skate of gear in 1914 was 165 pounds, while in 1926 it was 47 pounds. Then again, the size of fish taken is declining at an alarming rate. For instance, in 1921 the fish taken in Hecate strait were graded as 9.4 per cent large, 69.2 medium and 21.3 chickens and smaller, while in 1926 6.2 per cent were large, 63 medium, and 30.8 per cent chickens or smaller.

Extensive tagging operations have been conducted to determine the migration and to assist in ascertaining the growth of the fish. Studies have also been made as to races of fish, spawning conditions, sex, time of maturity, etc.

As it was essential that such work should be continued during the winter, including the close season, a suitable vessel was chartered for it. Splendid progress was made under the most trying weather and sea conditions until February 23 when the vessel was totally wrecked, but fortunately all on board were rescued, though the equipment of the scientific staff was lost.

About 7,000 fish were tagged up to the end of the fiscal year. Keeping in view the size and value of these fish, this is a large number. Of these approximately 900 have so far been returned. The commission explains that sufficient information has not yet been obtained to justify conclusions but the returns to date indicate that up to maturity there is practically no migration but that subsequently the fish may become migratory.

Investigations have also been conducted to determine the effects of using coarse and fine gear, i.e., large hooks and coarse lines, or small hooks and fine

lines. The indications are that the latter are more effective but do not, as was quite generally supposed, result in the capture of a much greater percentage of small fish.

The first report of the commission will be awaited with great interest not only by those interested in the two countries, but no doubt by investigators into fish life in all parts of the world.

#### MARINE BIOLOGICAL BOARD

This board operates under the control of the department. It has four stations; two on the Atlantic coast and two on the Pacific coast. At two of the stations on either coast, located at St. Andrews, N.B., and Nanaimo, B.C., fundamental researches are carried on, such as investigations into the life-history, growth and food of fishes, faunistic problems, physiological, biochemical and bacteriological work. At the other two located at Halifax, N.S., and Prince Rupert, B.C., the investigations deal with the methods of handling and preserving the products of the commercial fisheries. The Prince Rupert station was formally opened for work in November last.

During the year the board's staff, in addition to carrying on the ordinary work of the stations, again conducted short scientific and practical courses for fishery officers and fish hatchery officers, besides undertaking special investigations at the request of the Department.

The following were members of the board and its various committees during the year 1926:—

Dr. J. Playfair McMurrich, Chairman, Toronto, Ont.

J. J. Cowie, Secretary-Treasurer, Ottawa, Ont.

Dr. Philip Cox, Fredericton, N.B.

Dr. C. J. Connolly, Antigonish, N.S.

Dr. E. E. Prince, Ottawa, Ont.

Dr. C. H. O'Donoghue, Winnipeg, Man.

Very Rev. Canon Huard, Quebec, P.Q.

Dr. A. H. Hutchinson, Vancouver, B.C.

Dr. W. T. McClement, Kingston, Ont.

Dr. A. H. McKay, Halifax, N.S.

John Dybhavn, Prince Rupert, B.C.

A. Handfield Whitman, Halifax, N.S.

#### MEMBERS OF CENTRAL EXECUTIVE COMMITTEE

Dr. J. P. McMurrich, J. J. Cowie.

Dr. W. T. MacClement, Dr. E. E. Prince.

#### MEMBERS OF ATLANTIC SUB-EXECUTIVE COMMITTEE

A. Handfield Whitman, Chairman. Dr. A. H. McKay.

Dr. C. J. Connolly, Dr. P. J. Cox.

Dr. A. G. Huntsman, Secretary.

#### PACIFIC SUB-EXECUTIVE COMMITTEE

John Dybhavn, Chairman.

Dr. A. H. Hutchinson.

Dr. C. H. O'Donoghue.

Dr. W. A. Clemens, Secretary.

## RESEARCH COMMITTEE

Dr. A. G. Huntsman, Chairman.	Dr. R. E. Foerster, Secretary.
Dr. W. A. Clemens.	Dr. A. H. Leim.
Dr. C. H. O'Donoghue.	Dr. Philip Cox.

Director Atlantic Coast Stations, Dr. A. G. Huntsman.

Assistant Director Atlantic Coast Stations, Dr. A. H. Leim.

Director Nanaimo, B.C., Station and Advisory Director Prince Rupert Station, Dr. W. A. Clemens.

Director Prince Rupert, B.C., Station, Mr. D. B. Finn.

A detailed report on the work of the Board's staff will be found at Appendix No. 2 of this publication.

## SCALLOP AND OYSTER INVESTIGATIONS

During the summer of 1926 the department's naturalist conducted the following investigations:—

- (a) Scallop investigation in Mahone Bay, N.S.
  - (b) Scallop investigation at Ecum Secum, N.S.
  - (c) Oyster investigation in Tracadie Harbour, N.S., Ostrea Lake, N.S., and other localities in Nova Scotia and New Brunswick.
  - (d) Investigation of the effects of the slipper limpet on the oyster.
  - (e) Examination of quahaugs on the north shore of New Brunswick.
- A report on these investigations forms Appendix No. 4 of this report.

I regret to report the loss of life of sixty-five fishermen during the year—sixty-three on the Atlantic coast and two on the Pacific coast.

I am, sir,

Your obedient servant,

A. JOHNSTON,  
Deputy Minister of Marine and Fisheries.

## APPENDIX No. 1

### REPORTS OF INSPECTORS OF FISHERIES

#### REPORT OF WARD FISHER, CHIEF INSPECTOR OF FISHERIES, PROVINCE OF NOVA SCOTIA, FOR 1926

The upward trend in production and value of the fisheries of the province has been marked, largely due to the vigorous and successful efforts to extend the Canadian markets, and to create a demand for improved quality products in the United States. These efforts were largely the result of the Fordney tariff, so-called, on fish and fish products entering the United States, and revealed to a surprising degree the possibilities for expansion of trade by the adoption of methods well known and practised by those engaged in other industries.

It is interesting to note the progress for the four-year period, as follows:—

	Catch	Marketed value fish and fish products
	lb.	\$
1923.....	198,000,000	8,448,385
1924.....	219,000,000	8,777,251
1925.....	247,000,000	10,213,779
1926.....	315,000,000	12,505,922

The history of the industry during the year 1926, was one of the most unusual, unparalleled features. Never in the history of the fisheries was there greater interest awakened, greater production achieved, wider markets secured or a brighter outlook for the oldest of the provincial resources.

At the opening of the season the markets were practically bare of supplies, as the catches of the preceding year were hardly sufficient to meet the demands, notwithstanding the catches were 28,000,000 pounds greater than in 1924.

The shortage of supplies for the first three months of 1926, or until the end of the Lenten season, was so pronounced that a large number of orders from outside the province could not be filled. Indeed, this condition has continued to a considerable degree throughout the year. It is probably that this condition cannot be favourably met until operating facilities are greatly increased, and cold storage and processing establishments are enlarged.

The interesting feature in this regard, which speaks volumes for the need of continued enlargement of the markets is that the catches for the summer months of June, July, August, September and October were 52,000,000 pounds greater than the same period of 1925.

As a further evidence of the expanding markets, it should be noted that more than two thousand carloads of fresh and smoked fish products, together with large quantities of less-than-carloads, and by express, were forwarded to the upper provinces and the west as far as British Columbia.

An additional evidence of the growing interest in the fisheries is seen by the number of new and proposed establishments in all parts of the province.

The proposed new cold storage plant for Halifax has become an absolute necessity, and will probably be constructed during the present year.

The value of such establishments has already been referred to. Our inshore and offshore fisheries are of such particular value as to become a necessity. Fishing fleets, operating from ports where such plants exist, follow as a matter of course. Centralization of operations is important, if such fisheries are to survive or revive. Halifax, Canso, Port Hawkesbury, North Sydney, Yarmouth and Lunenburg are cases in point.

Fifteen new vessels were built the past year. In addition to these, a number of vessels employed in fishing, but for several years engaged in freighting, returned to the fleet.

The steam trawler *Willoughby* purchased in England arrived at Halifax November 25, from which port she will operate the present winter. The *Willoughby* is a 138-foot steel vessel, having a registry of 127 tons.

The *Lord Darling*, 100 tons net, which arrived from Grimsby in December, 1925, has been landing its catch at Canso and Port Hawkesbury.

### YEAR'S REVERSES

While the fisheries were prosecuted with eminent success, there were two outstanding reverses.

The loss of two of the Lunenburg fleet, with all hands, constituted the greatest tragedy in the history of the fleet.

In 1925, when four fishermen of the Lunenburg fleet were lost, the first sea-side memorial service was held. It was a beautiful and most impressive tribute, the sea bearing on its bosom the wreaths and flowers of remembrance, which drifted with the tide, rising and falling in unison with the singing by the choirs massed on the harbour front. It was not anticipated that greater cause for sorrow would come for many years.

The loss of life the past season was well nigh overwhelming, and held in thrall the eight thousand persons in attendance at the public memorial service held on Sunday afternoon, October 3.

The roster of the dead contained the names of 52 fishermen, 25 of whom were lost with the *Sylvia Mosher*, and 23 with the *Sadie Knickle*, when both schooners were wrecked off Sable island in August. The Captains, John D. Mosher and Charles Corkum, were exceptionally fine characters and held in highest esteem. They drew an eager, sturdy and enterprising group of fishermen to man the schooners. The loss, therefore, was the more deeply felt and added to the solemnity of the memorial service.

In the 7th of August gale 11 of the 13 large motor boats owned by the fishermen of New Harbor, Guysboro county, were lost, together with much fishing gear. Along other portions of the coast much damage was done to vessels, boats, establishments and gear.

### THE PRINCIPAL FISHERIES

The increase in the catch of all varieties of deep sea fish was general, with the exception of mackerel and tuna, which shows a decrease of over 500,000 pounds, and 10,000 pounds respectively. Herring increased by nearly 6,000,000 pounds.

The three outstanding fisheries were the cod, the catch of which was 185,890,000 pounds, having a marketed value of \$4,652,858, the haddock with a catch of 45,830,000 pounds, and marketed value of \$1,671,971, and the lobster fishery with a catch of 18,431,600 pounds, having a value of \$3,386,416.

The haddock fishery is becoming more valuable each year, as the demand for fresh, fresh filleted and smoked is rapidly increasing.

Of the cod catch the Lunenburg Grand Banks fleet landed 342,730 quintals, having an estimated value of \$1,700,000. The total number of vessels in the fleet was 92, an increase of 12 over 1925.

The average catch per vessel was 3,725 quintals, and like the total catch the highest in the history of the industry. The highliner for the season was the schooner *Mayotte*, Captain George Himmelman, with 5,450 quintals. The schooner *Mayotte* was at first mentioned as one of the possible contenders in the fishermen's races off Halifax, but at that time she was getting ready for a trip to Bay of Islands for a cargo of herring. The schooner *Maxwell Corkum*, Captain Leo Corkum, with 5,050 quintals, has the next highest catch.

The prices received for the first two catches this year was \$5.50 per quintal, a few vessels receiving \$6 per quintal. Several cargoes of the summer fish have been sold at \$5.50 per quintal, and it does not look as if the price will go any higher. Last year the fishermen received \$7.25 and \$7.15 for the first two catches, and \$8 for the summer catch.

### LOBSTER FISHERY

The lobster catch was 18,431,600 pounds, valued at \$3,386,416, and by districts as follows:—

Cape Breton catch, 4,287,400 pounds, valued at \$660,006, an increase of 909,600 pounds, and in value \$140,968.

Eastern Mainland catch, 6,036,700 pounds, an increase in the catch of 944,700 pounds, and in value \$202,293.

Western Mainland catch, 8,107,500 pounds, a decrease in the catch of 492,500 pounds, but an increase of \$28,192 in value, due to better prices.

The following totals show the catch, pack and values, as compared with 1925:—

	Catch	1926		Pack
	Cwts.	Marketed value	Cases	Value
		\$		\$
Inverness.....	14,603	205,769	6,358	193,456
Richmond.....	8,338	133,698	2,362	70,024
Cape Breton.....	12,975	196,204	6,315	188,430
Victoria.....	6,958	124,335	3,283	122,865
Halifax.....	8,217	169,953	1,858	58,185
Guysboro.....	17,952	309,473	5,599	176,688
Antigonish.....	9,816	164,096	5,264	161,304
Pictou.....	17,294	258,310	8,617	252,050
Colchester.....	330	5,287	174	5,202
Cumberland.....	6,758	102,874	3,134	91,667
Lunenburg.....	3,313	64,281	479	14,814
Queens.....	4,737	73,456	85	3,060
Shelburne.....	23,289	513,379	4,893	157,573
Yarmouth.....	37,024	761,351	6,866	226,201
Digby.....	11,937	285,626	990	31,631
Annapolis.....	706	16,944		
Kings.....	69	1,380		
	184,316	3,386,416	56,277	1,753,150

	Catch	1925		Pack
	Cwts.	Marketed value	Cases	Value
		\$		\$
Inverness.....	11,156	168,928	5,267	163,175
Richmond.....	6,721	98,540	2,676	77,068
Cape Breton.....	10,875	162,444	4,832	145,424
Victoria.....	5,026	89,126	2,456	86,230
Halifax.....	5,176	92,728	1,134	34,185
Guysboro.....	11,650	184,527	2,794	87,723
Antigonish.....	8,604	134,673	4,297	133,213
Pictou.....	16,840	265,139	8,649	261,485
Colchester.....	638	9,557	319	9,471
Cumberland.....	7,952	121,076	3,773	112,278
Lunenburg.....	2,327	32,182	306	9,580
Queens.....	5,751	77,923		
Shelburne.....	24,811	448,454	6,553	199,270
Yarmouth.....	39,977	836,152	9,420	300,058
Digby.....	11,941	265,514	1,269	40,482
Annapolis.....	1,043	23,500		
Kings.....	150	4,500		
	170,698	3,014,963	53,745	1,659,642

## MACKEREL, HERRING, ETC.

The mackerel fishery was quite generally unprofitable, as the American markets were well supplied and frequently over-supplied, with the large catches of the American fishermen. This was particularly true of the spring catch, which was so heavy as to keep the markets depressed during the fall run. As an instance of the conditions obtaining, it may be noted that of the large catch made at Hubbards early in November, 270 barrels were iced and shipped to Boston. The price offered was only 4 cents per pound, and as this would not pay transportation and duty charges, the shipment was returned to Hubbards, where the mackerel were salted and sold at a fair profit.

The gear largely used in the mackerel fishery, particularly of Cape Breton island, is wholly inadequate. While these fish were in great abundance in the island district, the catch was negligible, as hook and line fishing, largely practised, was futile the past year. Cape Breton pickled mackerel are the best produced and frequently bring a higher price in the American markets than importations from any other country. Notwithstanding the abundance of the American catches, there is a strong demand for the Cape Breton article, which demand cannot be met, owing to the inadequacy of the hook and line fishing method. Antigonish and the adjacent waters of Northumberland strait, teemed with mackerel, large quantities of which could have been taken had the fishermen been equipped with suitable nets. There are hardly 100 first class mackerel gill-nets along that shore.

Similarly, the herring fishery, which offers excellent opportunities for expansion, suffers from lack of proper fishing appliances. While greater attention has been given to this fishery the past year than for a long time, the markets for fresh and smoked herring are rapidly increasing in value.

The swordfish catch increased from 455,100 pounds to 1,293,600 pounds.

This fishery was a great boon to Cape Breton county, where the catch was nearly 800,000 pounds. The Guysboro county catch was over 300,000 pounds. Good prices were received by the fishermen, faring from 12 cents to 24 cents per pound. As a result of the success better equipped boats will be secured, and greater efforts made to exploit this valuable fishery.

Halibut increased from 2,025,000 pounds to 2,372,500 pounds, salmon from 842,200 pounds to 1,342,800 pounds, and flounders, skate and sole from 2,066,300 pounds to 3,526,400 pounds.

#### THE SCALLOP FISHERY

The scallop catch was 39,836 gallons shelled, valued at \$138,472, as compared with 24,808 gallons valued at \$76,025 for 1925. Of this quantity 29,285 gallons were taken in the Bay of Fundy waters, and 9,929 gallons in the Chester-Mahone district.

The Chester, Mahone bay, and adjacent Tancook islands district, was the earliest scallop fishery exploited commercially in the Maritime Provinces. It was not, however, until 1912 the the fishery was of sufficient importance to have a "habitation and a name" in the official statistical reports. In 1912 about 500 gallons, shelled, were reported. The catch gradually increased until more than 10,000 gallons, shelled, were taken. Over-fishing, however, has depleted. Since 1920 the catch has averaged about 6,000 gallons shelled, or 12,000 barrels.

The Bay of Fundy development is noteworthy, the catch increasing from 210 gallons in 1920 to over 29,000 gallons last year.

While it was well known that considerable quantities existed in Digby basin and the Bay of Fundy waters, it was not until 1920 that the fishery was taken seriously. In that year 210 gallons were produced in the basin waters. As this area was limited, and chiefly valuable for operating when weather conditions were not favourable in the outside waters of the Bay, attention was given to the Fundy waters of Digby and Annapolis, with the result that a most remunerative fishery has been established, having at present some twenty-six well equipped boats engaged, of which some fourteen were added the past year. The value of each boat and equipment would average about \$3,000. The total investment is nearly \$100,000 and exceeds in value the former fleet of Digby cod and haddock vessels. Many of the boats are equipped with special hoisting engine and gear, as hauling the rakes and bags from the deep waters of Bay of Fundy is too labourious to be done by hand.

Investigations have been continued along the coast from Digby to Canso. It is quite evident that the Bay of Fundy areas are very prolific, and extend all the way to Yarmouth, with the probability that the nature of the bottom is favourable for a much greater distance eastward.

With the increased production of the past five years, the markets have greatly improved. Large and regular shipments are made as far west as Chicago and Minnesota, arriving in excellent condition.

It is apparent that this fishery is bound to increase in importance, and afford good opportunities for the fishermen along the coast, not only of the mainland, but also Cape Breton, where it is known that scallops exist in good quantities.

#### THE OYSTER FISHERY

The total catch was 2,354 barrels, as compared with 2,644 barrels for the previous year. The opportunities for development are good, but little can be expected under the present unsatisfactory dual control, which is partly federal and partly provincial, resulting in a stalemate so far as any active comprehensive, or constrained efforts for betterment are concerned. A similar condition exists with respect to Prince Edward Island and New Brunswick.

Under proper control, and reasonable cultural assistance, the maritimes could within ten years produce at least 50,000 barrels of prime oysters. The markets are excellent and prices high. A good oyster is worth from \$15 to \$20 per barrel. A million dollar business giving employment to a large number of people should be the objective.

The Nova Scotia fishery has excellent possibilities. The two largest yielding districts, the River Dennys basin of Cape Breton island and the Caribou and adjacent districts of Pictou county, offer the best present opportunities. Oysters of fine quality are also taken in the Tracadie district of Antigonish county, and in Ostrea lake, Halifax county.

### SPORT FISHING

The excellent service of the Fish Culture Branch is again evidenced by the greatly increased catches of salmon and trout. The principal rivers and streams were alive with young salmon and trout—young salmon and grilse having been particularly abundant.

The catch of the anglers in the Mersey was about 1,200 salmon, and on the Medway about 500. On the St. Marys the catch was greatly increased, the run being particularly heavy during June.

On the Margaree sportsmen captured about 500, as compared with 363 the previous year. While the June catch was small, owing to the weather being unusually cool, the run during July and August was good. On the Cheticamp the catch was 100. Since the installation of a fishway at Grand river, salmon are entering Loch Lomond, and a number were taken by anglers for the first time.

There is every prospect that with the continuation of the restocking of our inland waters, the sport fishery will continue to increase in value from year to year.

It should be pointed out that the salmon net fishery of the river estuary and coastal waters depends to a very large degree on the prosperity of the river fishery, and therefore all efforts to restock and protect the river fishery is of prime importance.

The total catch of salmon by anglers and netsmen was 1,342,800 pounds, having a value of \$253,000, as compared with 842,201 pounds for 1925. In 1920 the catch was only 336,100 pounds. The chief catches by the net fishermen were, in Northern Inverness 167,100 pounds, Antigonish 154,000 pounds, Guysboro 201,100 pounds, and Halifax 302,900 pounds. Increased catches were also taken in Queens and Kings.

### PROTECTIVE SERVICE

The *Arras*, in command of Captain Barkhouse, laid up for annual overhauling and repairs on April 12, and was again in commission on June 22, sailing for the banks as "mother ship" to the Grand Banks fleet on June 28, returning on September 10.

Dr. D. R. Webster, medical officer, reported 176 fishermen of the Lunenburg fleet received medical treatment, as compared with 124 the previous season. This service was much appreciated and assisted greatly not only in relieving disabilities, but in saving much time and expense to the vessels of the fleet.

The medical officer reports:—

"The *Arras* is totally inadequate for the work. Apart from being a small, slow boat, rolling badly, there is absolutely no accommodation for a sick person, one of the officers having to yield his berth. The saloon has to be used for consultation and treatment resulting in upset of the steward's routine and watches aboard the ship."

The *Arleux*, in command of Captain Cousins, sister ship to the *Arras*, was laid up for annual overhauling and repairs on February 2, and was again in commission on March 31. She was kept constantly busy during the year in ice-breaking, assisting vessels caught in the ice or otherwise distressed.

One noteworthy event was the successful trip to Sable island in search of bodies or wreckage from the Lunenburg fishing vessels *Sadie Knickle* and *Sylvia Mosher*, which were lost with all hands in the severe storm of August 7 and 8.

Both these ships rendered service of highest value.

The following is a report on the work performed by these boats:—

CRUISER "ARRAS"—CAPTAIN C. BARKHOUSE

The *Arras* was in commission on April 1 and at that date was at Mahone bay breaking ice and clearing channel to the town wharves.

April 6. Finished ice work at Mahone bay and Lunenburg.

April 7. Arrived Shelburne to clear ice from wharf.

April 9. Pulled the American fishing schooner *Josephine DeCosta* from shoal in Shelburne harbour to safe berth at wharf.

April 10. Proceeded and towed the schooner *Daniel Getson* out of ice to safe berth in harbour, then proceeded cruising east, arriving at Liverpool same day.

April 12. Received telegram from Deputy Minister of Marine and Fisheries to lay ship up, blow down boiler and get ready for annual refit.

April 14. The inspectors from Halifax inspected the ship and repairs needed. The crew were given annual leave for fourteen days, part of crew away at one time; the others went on return of first party to ship.

The ship was under her refit until June 19, and on June 22 proceeded to sea, cruising toward Lunenburg, and arrived at Halifax on June 23 to take in supplies for cruise to Grand Banks of Newfoundland with the Canadian fishing fleet.

June 26. Proceeded to sea and arrived at North Sydney June 29 to complete with coal.

June 30. Proceeded towards Newfoundland.

July 2. Arrived at Cape Broyle with the fishing fleet.

From July 3 to August 31 the ship was in close touch with the fishing fleet, giving medical attention and treatment to all sick men and taking hospital cases to the hospital at St. Johns. During the season one hundred and eighty-five sick fishermen were given medical treatment.

September 1. All fishing vessels were leaving for home and western banks. We then proceeded towards Cape Race to calibrate the Direction Finding Station.

September 4. We finished calibrating station and proceeded to sea cruising towards the western banks and Cape Breton waters.

September 7. Arrived North Sydney for coal and proceeded same day for south coast Cape Breton to watch American swordfishing vessels.

September 9. The swordfishing fleet leaving for western coast we proceeded west, calling at Halifax, Lunenburg, and Liverpool, returning to Halifax on September 11.

The ship then cruised on western station until 20th, when we received orders to proceed to Bridgewater. We remained at Bridgewater from September 21 until the 24th.

September 27. Arrived Liverpool to blow down and examine boiler for cleaning.

October 2. Proceeded to sea on patrol duty and at Lunenburg October 3 to attend the memorial service to fishermen lost during the storm off Seal island.

October 4. We proceeded to sea on patrol duty cruising towards Northumberland strait and Prince Edward Island waters calling at Halifax, Liscomb, Port Hawkesbury and arrived at Pictou, October 7.

October 8. We proceeded to assist the Inspector of Fisheries in stopping illegal lobster fishing at Pictou island and adjacent waters.

October 11. Embarked Mr. Sutherland, Inspector of Fisheries, and proceeded towards Pugwash and adjacent waters to clear up illegal lobster fishing.

October 12. Stopped and seized one motor boat and sent her in to Pugwash then proceeded towards Souris, Prince Edward island.

October 14. Arrived Halifax to attend the fishing schooner races.

October 16. Embarked Mr. A. Johnston, the Deputy Minister of Marine and Fisheries, to attend the schooner race.

October 18. Embarked the Bermuda football team to attend the schooner races.

October 22. Proceeded to sea on patrol duty cruising west calling at Lunenburg, LaHave, and Liverpool.

October 27. Found the American four mast schooner *H. Glass* anchored in dangerous position off Petite river and towed her to safe anchorage at Lunenburg.

October 29. Proceeded to sea cruising east, calling at Halifax, White Head, Louisburg, and arrived North Sydney, November 3 for coal.

November 4. Proceeded to sea cruising west, calling at St. Peters and arrived Halifax November 6. We proceeded same day cruising west, calling at Lunenburg, LaHave, and arrived at Liverpool. We then proceeded towards Halifax to calibrate Chebucto Head Direction Finding station.

November 11 and 12. Calibrated Direction Finding station and arrived Lunenburg. We then proceeded west, calling at LaHave and arrived Liverpool, November 13.

November 15. Proceeded to sea calling at Halifax, Sheet harbour, Port Hawkesbury, and arrived at Pictou, November 19.

November 20. Proceeded to sea calling at Port Hawkesbury and arrived North Sydney, November 22, for coal.

November 23. We proceeded to sea cruising west, calling at Port Bevis, St. Peters, Canso, and arrived Halifax, November 26.

November 29. We proceeded to sea cruising west, and took up our cruising station between Mahone bay and Shelburne.

December 8. Pulled the fishing schooner *R. L. McKenzie* off rocks at Lockeport.

December 10. Pulled the fishing schooner *Kathleen Creaser* off mud bank at Riverport.

We then proceeded on our station breaking ice, assisting fishing vessels, attending to small buoys and watching conditions on coast until February 2, when we received orders to proceed to Yarmouth and lay up for our annual refit.

February 3. Proceeded west calling at Liverpool and Shelburne. Arrived at Bakers wharf, Yarmouth, on February 7.

February 17. Inspectors from Halifax, inspected ship going over defects and starting work on ship.

The crew were given fourteen days annual leave.

The Lunenburg Grand Bank fishing fleet consisted of seventy-two sail; French fishing vessels, fifty-six sail; Newfoundland fleet twenty-one sail, and Portuguese fleet, twenty sail.

The Lunenburg vessels had a large catch of fish and plenty of squid bait on banks. Only two caplin baitings were taken the first part of season. From July 10 to the end of August, the Banks were covered with squid. The best

fishing was done forty to fifty miles east from the Virgin rocks. The French fleet all filled up and left the Banks, August 26. Newfoundland and Portuguese fleets left Banks all well filled on August 20.

On Middle bank, Quero bank, and St. Pierre banks we had forty-one French beam trawlers, also ten Canadian beam trawlers and eight United States beam trawlers.

During the year we had fifty-three American fishing vessels on the stations we were working on, these we boarded and examined fifty-seven times.

We had very few complaints about illegal fishing by foreign fishing vessels and not one complaint of interference by French beam trawlers on the Grand banks of Newfoundland.

During the year we gave assistance to thirty-one vessels, broke ice and cleared harbours and channels in Mahone, Riverport, Bridgewater, Lockeport, and Shelburne.

During the year we steamed eleven thousand, one hundred and fifty-one miles and consumed nine hundred and thirty tons of coal.

#### CRUISER "ARLEUX"—CAPTAIN H. P. COUSINS

March 30. The Lunenburg foundry finished repairs to ship.

March 31. Ship proceeded to sea arriving at Halifax for coal and supplies.

April 7. Cruising westward towards Lunenburg and Shelburne on patrol work.

April 8. Arrived at Shelburne, boarded several United States fishing vessels.

April 9. Proceeded towards Mahone bay and Indian point to break ice.

April 10. Breaking ice at Mahone bay and Indian point and proceeded to Lunenburg.

April 11. Breaking ice in LaHave river and assisting steamer *Urter* through ice to Bridgewater.

April 12. Breaking ice in LaHave river and Riverport.

April 13. Breaking ice and assisting fishing vessels to wharf at Riverport, breaking ice off shipyard Dayspring.

April 14. Breaking ice in LaHave river and releasing fishing vessels from ice.

April 15. Assisting vessels through ice in LaHave river.

April 16. Breaking ice in LaHave river and assisting fishing vessels through ice.

April 17. Pulled new fishing vessel *Pan American* afloat which was broken down on launch ways.

April 18. Proceeded to Halifax for supplies.

April 19. Proceeded towards Country Harbour to break ice.

April 20 to 23rd. Breaking ice in Country Harbour and proceeded to Guysboro.

April 24. Breaking ice at Guysboro and proceeded to Canso.

April 26. Pulled off the American fishing vessel *Columbia* ashore at Canso

April 28. Cruising westward.

April 29. Arrived at Halifax for coal and supplies.

May 1. Proceeded towards Canso to assist stranded fishing vessel *Hali-gonian*.

May 2. Arrived at Canso.

May 4. Pulled stranded schooner *Hali-gonian* off Canso ledges.

May 8. Breaking ice and releasing vessels at St. Peters canal.

May 12. Cruising westward towards Halifax.

- May 13. Arrived at Halifax.
- May 15. Cruising westward towards Lunenburg.
- May 20. Proceeded to LaHave river to assist schooner *Minas Prince*.
- May 21. Arrived at Lunenburg.
- May 25. Several United States seiners arrived in port, first to arrive on coast
- May 26. United States seiners arriving in port, no mackerel reported.
- May 29. Cruising off Sambro with thirty United States seiners, no mackerel sighted.
- May 30. Cruising off Sambro with thirty-seven seiners in sight.
- May 31. At Halifax for supplies, seiners in port.
- June 4. Cruising off Sambro with seining fleet.
- June 6. At Halifax, seiners in port.
- June 11. Cruising towards Canso with seining fleet, some mackerel taken. Local fishermen in Chedabucto Bay taking good hauls of mackerel from nets.
- June 13. Cruising off White point with seiners.
- June 16. Cruising towards Louisburg, seiners working west. Local fishermen taking few mackerel from nets.
- June 18. Cruising westward, United States seiners leaving coast for home, several seiners taking good catches of mackerel.
- June 20. Arrived at Halifax.
- June 28. Cruising westward towards Bridgewater and Liverpool on patrol work. Boats landing good fares of fish at Liverpool.
- July 5. Arrived at Halifax.
- July 9. Cruising westward towards Lunenburg and Shelburne, quite large quantities of herring taken at Shelburne. No American fishing vessels in port.
- July 15. Cruising eastward towards Liverpool and Lunenburg, large quantities of herring taken at Liverpool. No American fishing vessels in port.
- July 18. Arrived at Halifax for coal.
- July 23. Proceeded on patrol towards Lunenburg.
- July 26. Searching for illegal lobster fishing in Mahone Bay.
- July 27. Cruising westward towards Liverpool and Shelburne, herring being taken in large quantities at Liverpool and Shelburne. No American fishing vessels in vicinity.
- August 2. Cruising eastward towards Liverpool and Lunenburg.
- August 5. Arrived at Halifax for coal and supplies.
- August 9. Proceeded cruising eastward towards Canso.
- August 11. Cruising in Northumberland Straits to prevent illegal lobster fishing.
- August 19. Cruising towards Pictou and Canso.
- August 21. Cruising westward, sighted large fleet of local swordfishermen between Canso and Country Harbour, boats taking few swordfish. Several American swordfishermen off shore working westward.
- August 22. Arrived at Halifax.
- August 25. Proceeded cruising towards Sable Island in search of LaHave fishing vessel *Sadie Knickle* missing since the gale of August 7.
- August 26. At Sable Island. Landed on island and took up search for wreckage. Found on N.W. bar water tank and barrel of flour washed ashore from schooner *Sadie Knickle*, which proved that schooner had floundered near Sable Island.
- August 27. Continued search for more wreckage, cruising around N.W. bar and discovered two masts partly above water badly burned, supposed to be the American fishing vessel *Falmouth* burned near Sable Island in month of June.
- August 28. Arrived at Halifax, cleaning ship's boiler.

September 3. Cruising westward on patrol.

September 9. At Liverpool. Proceeded towards LaHave banks with party from Government Motion Picture Bureau on board taking moving pictures of vessels and dories fishing on bank.

September 10. Arrived at Halifax.

September 13. Proceeded towards St. Margarets bay, conveyed seized Italian steamer *Dori* which smuggled immigrants at Mill cove. Arrived with steamer at Halifax.

September 14. Ship hauled on marine railway at Dartmouth for underwater repairs and new bow plates for ice breaking.

October 1. Proceeded westward towards Chester and Lunenburg on patrol work.

October 3. At Lunenburg, attending memorial service for the men lost from the Lunenburg fishing fleet during the season of 1926.

October 4. Proceeded westward towards Liverpool. Fair quantities of mackerel taken in traps, no American seiners on coast.

October 6. Cruising eastward towards Halifax.

October 16 to 19. Attending schooner races *Bluenose* and *Haligonian* with press representatives on board.

October 22. Cruising westward in search of illegal lobster fishing.

October 26. Arrived at Shelburne, boarded several American fishing vessels.

October 27. Cruising towards Yarmouth.

October 29. Cruising up Bay of Fundy towards Digby, passed large fleet of scallop fishing boats. Fishermen report good scallop fishing, a number of boats being added to the scallop fleet during the year.

November 2. Proceeded to St. John, N.B. Fishermen report taking good catches of fish during season.

November 5. Proceeded towards Digby.

November 6. Cruising Bay of Fundy towards Yarmouth. Fishermen in Bay of Fundy report making good catches of fish during season. Boarded several American fishing vessels at Yarmouth.

November 15. Rechecking Yarmouth D.F. Station.

November 16. Rechecking wireless station.

November 18. Arrived at Liverpool, cruising towards Halifax.

November 19. Arrived at Halifax for coal and supplies.

November 26. Cruising westward on patrol work.

December 3. Arrived at Halifax for coal and supplies.

December 9. Proceeded cruising towards Canso.

December 10. Arrived at Canso to protect the winter fishing fleet.

December 14. Cruising in Chedabucto Bay with Canso fishing fleet.

December 17. Proceeded to Gut of Canso, pulled off stranded schooner *Lady Hill* ashore east side of Gut of Canso. Took schooner in tow to safe harbour Port Hawkesbury.

December 18 to January 21, 1927. Patrolling off Chedabucto Bay and White Point protecting fishing fleet and assisting motor fishing boats with engine trouble.

January 21. Fishing over at Canso, fish passing westward. Canso fishing fleet had a successful season for haddocking the best in several years. Owing to the mild weather the fishing fleet fished until January 21, 1927, the latest the fish have remained on the coast for several years.

January 23. Ship proceeded towards Halifax.

February 5. *Arleux* relieved C.G.S. *Arras* at Liverpool and took up ice patrol duties breaking ice in harbours along the coast and releasing fishing ves-

sels from ice to prepare for their first trip to the fishing banks. The following harbours were broken open and vessels released:—

Harbours broken open—Riverport, LaHave, Mahone Bay, Indian Point, Shelburne, Sheet Harbour, Country Harbour and Boylston.

Vessels released and assisted through ice—*Arucante*, *Pulitana*, *Mary Pauline*, *D. D. MacKenzie*, *Delawana II*, *Marshal Frank*, *Autagua*, *R. M. Symons*, *Clara Creaser*, *Agnes J. Myra* and several other fishing vessels relieved from ice. Assisted pulp steamer *Adolf Bratt* to wharf through ice at Sheet Harbour and assisted steamer out of harbour.

The *Arleux* was successful in keeping the harbours open on the coast and giving assistance to the fishing fleet during the winter.

March 29. Reported all harbours open. The *Arleux* takes up her usual fishery patrol duties.

#### FISHERIES PATROL SERVICE

The patrol boat *Mildred McColl*, in command of Captain Williams, went into commission on April 15. During the season a 50 horse-power Bergsund crude oil engine was installed to replace the worn out Sterling engine. Also a 4 horse-power hoisting engine was installed for the purpose of adequately fitting her out for scallop investigation in the work in which she was engaged with Mr. Andrew Halkett, the naturalist of the Department, in investigating scallop conditions along the eastern shore. The larger part of the work was in lobster and scallop protection service.

This boat is now admirably outfitted for any duty that may arise.

Patrol boat *F. P. I.*, commanded by Captain Baker, went in commission June 15, and laid up December 21. While this boat gave every satisfaction during the season, the district from Minas Basin including the Bay of Fundy shore, around to Lockeport, Shelburne county, is too great to be patrolled in any adequate manner. A substantial boat is required for the Bay of Fundy district to Brier Island, including St. Mary's Bay, particularly since the development of the scallop fishery of the district, as under present conditions it takes a month to make a single patrol over the district.

The Inspectors and Overseers have quite satisfactorily dealt with the rapidly increasing volume of work due to the greatly increased interest in the fisheries. The Fish Culture Branch, the Experimental Station and the Pickled Fish Officers have assisted in our work very materially. In particular, Mr. Andrew Halkett, the naturalist of the Department, has been performing service of greatest value. Indeed, during the past five years Mr. Halkett's investigations and studies of our shell fisheries have been of highest importance. The value of his work among the fishermen is evidenced by the increasing sympathy and assistance given him by the fishermen where his investigations are carried on.

# REPORT OF J. F. CALDER, INSPECTOR OF FISHERIES, DISTRICT NO. 1, PROVINCE OF NEW BRUNSWICK, FOR 1926

District No. 1 comprises the counties of Charlotte, St. John, Albert and the Bay of Fundy watershed of Westmoreland county.

The following statement shows the catches and marketed values for the past year:—

		Value	
Cod.....	40,544 cwts.	\$	86,345
Haddock.....	33,042 "	"	72,680
Hake.....	38,652 "	"	33,521
Pollock.....	38,271 "	"	47,185
Halibut.....	140 "	"	2,413
Flounders.....	1,807 "	"	5,818
Skate.....	181 "	"	480
Herring.....	228,611 "	"	327,439
Sardines.....	171,637 bbls.	"	1,172,490
Smelts.....	312 cwt.	"	4,063
Alewives.....	34,400 "	"	86,027
Salmon.....	3,810 "	"	74,275
Shad.....	3,384 "	"	35,425
Cockles.....	76 "	"	418
Dulse.....	5,186 "	"	13,780
Lobsters.....	6,130 "	"	213,808
Scallops.....	245 "	"	1,084
Winkles.....	1,409 "	"	3,903
Clams.....	17,833 bbls.	"	75,718

The total value of the catch marketed is \$2,296,541 against \$1,859,003 for the previous year.

## COD

A large increase is to be noted in the catch of cod as compared with that of the previous year—40,544 cwts. against 19,370 cwts. for 1925.

## HADDOCK

Haddock were plentiful, especially during the latter part of November and the month of December. The total catch was 33,042 cwts, as compared with 16,539 cwts. for the previous year.

## HAKE

There was a large falling off in the catch of hake as compared with the previous year. The yield for the present year was 38,652 cwts. while 59,643 cwts. were taken in 1925. The shortage in the catch was not entirely due to scarcity of the fish; a considerable portion of it is due to the very poor prices being paid for the fish. If, at least, fair prices had been offered, the catch would have been much greater.

## POLLOCK

A satisfactory increase is again to be noticed in the catch of pollock as compared with the previous year. Thirty-eight thousand two hundred and seventy-one cwts. were taken this year as compared with 28,804 cwts. in 1925, and 8,391 cwts. in 1924. Of course, this catch is very much less than that of a number of years previous to 1924. At the same time, it is reassuring to know that the catch for the past two years is on the increase.

## HERRING

A considerable increase is to be noted in the catch of herring as compared with the previous year—228,611 cwts. were taken this year, while 171,814 cwts. were taken in 1925. The greater portion of these fish are put up as smoked

herring, which is largely confined to the island of Grand Manan. Again there was an abundance of these fish, and one of the largest packs of smoked herring ever made was put up. At the same time, a very much larger quantity would have been put up if there had been a market for the product. The demand for smoked herring, at the present time, is poor and the price is low. The quality of the fish is very fine and a large pack was made; at the same time, unless there is a marked improvement in the market conditions, very little, if any, money will be made from this very important branch of our fisheries.

#### SARDINES

There was a slight increase in the catch of sardine herring—171,637 barrels were taken this year as compared with 158,259 barrels for the previous year. Sardine herring were again very plentiful, with a very limited demand. The American canneries took only limited quantities, while they were in operation. Most of them did not open until quite late in the season and closed down by the middle of October. Owing to the abundance of these fish, the limited demand for them, the large quantities which went unsold and the evident, organized attempt of the canners to break the "Sale for Export" price condition in the license for the weirs, as well as the disposition on the part of many of the licensees to become a party to such infraction, the task of enforcing the arrangement became unbearable. A considerable number of the licenses were suspended for alleged violation of the sale condition. Inquiries under oath were held in each case. A number of convictions were obtained and the licenses cancelled. Others were found to be innocent and other dismissed for lack of evidence. Owing to the almost insurmountable obstacles in connection with the enforcement of this condition, and the lack of co-operation of a large number of the licensees, to say nothing of the all too-evident disposition on the part of some to break the condition, the situation became extremely unsatisfactory; it appeared to have reached the stage when only the men who would violate the sale condition, were selling their catches. But, right here, I want to pay tribute to the large number of upright, honest fishermen who stood honourably by the arrangement, which, as you are aware, was adopted at the solicitation of all the fishermen. These men lost the opportunities to sell their catches, while their unprincipled neighbours were disposing of theirs. In view of all this, it was finally deemed necessary by the Department, and wisely, I think, under the circumstances, to rescind the sale condition. At the same time, there is no question but this arrangement put several hundred thousand dollars in the pockets of our fishermen during the three years it was in operation; the fact that the canners were so persistent and resourceful in their efforts to defeat the measure, is sufficient proof of such statement. Next year, the fishermen will have to fight their own battles in this regard. The outcome will be closely followed. I sincerely hope that the canning combine pay our people a fair price for their fish. However, if they do not, I shall recommend an amendment to the Fisheries Act requiring all boats, engaged in buying herring from the weirs, to take out a license under certain conditions, with the license to be forfeited in case of any of the conditions being violated. This will place the restrictions on the foreign buyer and not on the weir-owner, as was the case with the arrangement which has been done away with.

I am pleased to be able to report that the local sardine pack was the largest in the history of the industry. I am reliably informed that the pack next year is to be even greater than it was during the present year.

MARINE AND FISHERIES

SALMON

Again there was a considerable increase in the salmon catch; 3,810 cwts. were taken against 3,193 cwts. in 1925, and 2,793 cwts. in 1924. It is gratifying to know that the salmon fishery is more than holding its own.

CLAMS

An average quantity of clams—17,833 barrels—were taken during the present year. The yield for 1925 was 11,507 barrels, while 23,907 barrels were taken in 1924. As stated in previous reports, the quantity of clams taken really depends on the demand for them and the prices being paid. It seems that there is never any difficulty about procuring the quantity the trade requires.

SHAD

There was a slight falling off in the quantity of shad taken—3,384 cwts. against 3,797 cwts.—for the previous year. However, shad sold at a good price and the fishermen did well for the short time they were engaged. There was no run of fall shad.

ALEWIVES

The Alewife catch was practically double that of the previous year—34,400 cwts. were taken against 17,800 cwts. for the previous year. A ready market, with a fair price, obtained for this product.

LOBSTERS

There was a slight increase in the quantity of lobsters taken; 6,130 cwts. were taken this year as compared with 5,691 cwts. for the previous year. Good prices were paid for lobsters. The value of the catch marketed being \$213,808.

There is not much to note with regard to other minor branches of the industry.

I regret to report that the concerns engaged during the past few years in procuring the essence of pearl from herring scales were not in operation during the present year.

A better feeling is prevailing in the industry. It looks as if it is in for considerable improvement in the very near future. We have an abundance of the very best deep-sea fish to be found anywhere in the world, but market conditions have been deplorable during the past few years. All our fishermen need is the opportunity to sell their catch at a fair price.

CONFISCATIONS

Confiscations..... 60

PROSECUTIONS

Prosecutions..... 27

# REPORT OF A. L. BARRY, INSPECTOR OF FISHERIES, DISTRICT NO. 2, NEW BRUNSWICK, FOR 1926

This district covers that part of New Brunswick bordering on the bay Chaleur, gulf of St. Lawrence, and Northumberland strait, and including the counties of Restigouche, Gloucester, tidal waters of Northumberland, Kent, and the strait side of Westmorland county.

The total marketed value of the fisheries of this district for 1926 was \$2,998,007 compared with \$2,905,351 of the previous year, an increase of \$92,656. The following table shows the comparison between the catch and value of the fisheries for the years 1925 and 1926:—

	1926		1925	
	Quantity	Value	Quantity	Value
		\$		\$
Lobsters.....	53,481 cwt.	921,856	60,193 cwt.	874,569
Smelts.....	59,088 "	846,850	46,326 "	711,031
Salmon.....	20,779 "	320,322	26,334 "	357,421
Cod.....	160,890 "	386,273	186,174 "	472,388
Oysters.....	12,383 bbls.	92,535	12,038 bbls.	88,693
Tomcods.....	17,079 cwt.	61,242	13,056 cwt.	38,717
Herring.....	194,290 "	201,756	200,892 "	197,868
Clams and quahaugs.....	9,445 bbls.	35,644	7,989 bbls.	25,614
Mackerel.....	19,088 cwt.	65,188	16,707 cwt.	63,952
Alewives.....	17,717 "	28,426	16,395 "	24,323
Hake and cusk.....	5,166 "	11,583	7,249 "	12,544
Haddock.....	1,996 "	3,800	1,647 "	3,014
Shad.....	1,313 "	9,071	2,025 "	18,197
Flounders.....	50 "	50	231 "	704
Scallops.....	315 bbls.	3,678	11 bbls.	88
Mixed fish.....	51 cwt.	51	45 cwt.	45
Trout.....	137 "	2,040	161 "	2,256
Bass.....	426 "	6,590	477 "	6,820
Eels.....	119 "	894	406 "	2,750

## LOBSTERS

There was a decrease of 6.712 cwts. with an increase in value of \$47,287. The decrease was general, all along the coast. Over-fishing, due to fishing out of season, must be ascribed as the main reason for the decrease, that is going on year after year. The taking of berried lobsters in certain parts of the district, a matter which is very hard to check, is also a reason for the falling off of the catch.

## SMELTS

There was an increase of about 13,000 cwts. with an increase of \$135,819 in value. In some parts of the district, notably at Baie Verte and Bathurst, the catch of smelts was the best for a number of years. It fell away considerably in the Miramichi district and the fishermen were particularly hard hit by the fact that very few smelts were taken in the river at the beginning of the season. There appears to be no apparent reason for this. A great loss was sustained in the Miramichi river early in the season when 140 nets were carried out by the ice. This represents a loss of approximately \$15,000. Since the introduction of the box net at Buctouche, the taking of smelts by spearing is gradually disappearing and only a few spearing shanties are now in operation. The quality of the smelts is thereby improved. There is a tendency among the fishermen to do away with the smelt gill-net fishing for a number of reasons. First, they receive only a small price for real high quality smelts. Secondly, the gulls

destroy a large quantity by diving down and digging them out of the nets. Thirdly, the better class of fishermen realize that the use of the gill-net paves the way for illegal fishing by bag-nets. Last fall the fishermen of Richibucto and vicinity held a meeting and voted unanimously to have the gill-net fishing discontinued. The year before the fishermen at Buctouche river asked and obtained the same restriction and it is hoped this coming year to extend the restriction further south.

#### SALMON

There was a decrease of nearly 6,000 cwt. and a decrease of \$37,099 in value. There is always a good demand for these fish and the large number of refrigerating plants along the shore makes it possible to take care of a large catch. The catch of the drift-net fishermen this year, for the Northumberland straits, opposite the Miramichi, was considerably less than any year since 1921, only 2,817 cwts. being taken by 56 boats, some of which did not pay the operating expenses.

#### COD

The catch of cod decreased 25,334 cwts., with a corresponding decrease in value of about \$86,000. The price of dried cod brought only \$6 per quintal compared with \$8 for the year before. Continuous windy weather throughout the fall probably accounts for the decrease in catch.

#### OYSTERS

There was a slight increase in the catch of oysters for 1926, being 345 barrels more than the previous year. There was an increase in the value of \$3,842. There is always an excellent market for this fishery and if some steps could be taken to improve the standard, and if they were put up in standard containers subject to inspection, there is no doubt that some dealers would take up the matter of cultivating oyster beds.

#### TOMCODS

There is an increase of 4,023 cwts. in the catch of tomcods, and an increase in value of \$22,525. There seems to be no decrease in the run of these fish, which are quite plentiful all over the district.

#### HERRING

Herring decreased in catch 6,602 cwts., but increased in value \$3,904. The rough weather in early fall interfered greatly with the catching of these fish.

#### MACKEREL

Mackerel showed small increases in catch and in value. There seems to be no great demand for this fish, which if a better market obtained could be taken in large quantities along the coast.

#### ALEWIVES

The catch and value of alewives increased over 1925. Practically all of these fish are shipped in a pickled condition.

#### SCALLOPS

While this fishery is not much developed in this district yet the number of licenses issued is increasing year by year; 315 gallons of shelled scallops were sold by the bay Chaleur fishermen last year, a considerable increase over the

previous year. There is no doubt there are extensive beds in bay Chaleur which only need experienced fishermen to make them yield a good return.

#### CLAMS AND QUAHAUGS

There was an increase in both catch and value of this fishery. One of the larger clam canners in the southern part of the district is making extensive improvements to the plant so it is anticipated that the pack will be much larger next year.

#### GENERAL

The decreased catch of lobsters for the year 1926 has caused many fishermen and dealers to realize that unless more drastic steps are taken for the protection of this fishery, many canneries will be forced out of business. What seems to be a turn for the better was indicated recently at a meeting of the lobster packers held at Moncton, when in conjunction with the fishery officers the packers agreed to work hand in hand with the department for better protection. Better results are looked for in 1927. A new method of checking up the lobster pounds was instituted last year, namely, weighing the lobsters left in pounds at the close of the fishing season. This has already shown good results and will be continued next year.

The coast has been visited by a number of severe storms during the year with considerable damage to lobster rigging and fishing vessels. One vessel was lost off Miscou island, value \$500 and another damaged to the same extent. Damage to the extent of \$1,000 was also caused to fishing staging and gear. Generally speaking there has been an improvement in the equipment of lobster canneries, more packers having installed the steam retort.

A regrettable incident occurred in October in Kent county when a guardian lost his life, apparently through foul play, by whom has not yet been determined. This guardian was engaged in the protection of the smelt fishery by night when he lost his life and the result has been to cause many fishermen to realize that continued violations of the law may eventually lead to something more serious. It would seem that a system of patrol by two or more guardians at seasons of the year when much illegal fishing is done would be necessary. One other fisherman lost his life while repairing a small schooner, the prop falling from under the boat which fell on him with fatal results.

Prosecutions numbered the same as last year, namely seventeen. The offences were as follows: Canning without a license, four; Fishing for lobsters out of season, three; fishing without a license, three; having illegally caught fish in possession, two; selling undersized fish, two; fishing salmon with an illegal mesh, one; dragging for oysters in a motor boat, two.

Confiscations dropped from 111 to 54. This was due largely to a part of the Miramichi Salmon waters being put under the district of Inspector Harrison.

There has been a continuous demand from the fishermen of the Miramichi to have more vigorous action toward the destruction of seals in the Miramichi Bay. To this end the fishermen have asked that the fee on salmon nets be brought back on the Miramichi waters and the amount realized from this fishery to be used for the destruction of seals. This request has been granted by the Department and it is expected to have between \$800 and \$1,000 available for this work this year.

# REPORT OF H. E. HARRISON, INSPECTOR OF FISHERIES, DISTRICT No. 3, NEW BRUNSWICK, FOR 1926

District No. 3 comprises the counties of King's, Queens, Sunbury, York, Carleton, Victoria and Madawaska.

The spring of 1926 opened up just a month later than that of 1925. In the former year the first steamboat left St. John for Fredericton on the 4th of April, whereas the St. John river ice made its final move on the first day of May, 1926, and numerous may poles were erected on it as it made its way towards the Bay of Fundy. Likewise the earliest spring fishing, that of alewives, was delayed. On the 18th of April, 1925, the first fresh and fresh-smoked alewives were brought to the Fredericton market. In 1926 the first of this fish reached here the 8th of May, and both lots came from the Oromocto river, a tributary of the St. John a short distance below Fredericton. The Oromocto river opens up earlier than the St. John because of a strong current cutting the ice out before the spring freshet attains much height. Consequently about the first alewives taken in my district are taken from this river some eighty odd miles from the Bay of Fundy, and the late and cold spring affected the earlier runs of fish, such as the alewives and shad, but while the spring was late, and the weather kept cold and disagreeable for a considerable time after the ice moved out, the fishermen on the whole had a fairly successful season, a notable exception being the shad fishery, offset to some extent by the very good bass fishery.

The following figures in order of statistical record will give you at a glance the quantities and value of the different kinds of fish taken during the years 1925 and 1926.

ALEWIVES			
Year		Cwt.	Value
1925.....		684	\$2,052 00
1926.....		758	2,274 00

I think that there is no question but that the quantity of alewives taken could be greatly increased if there were a market sufficiently remunerative to induce the farmer-fishermen to fit out and operate, but this fish deteriorates in quality apparently quite quickly after entering the rivers and buyers for export do not care to handle many. Consequently the demand is not sufficient to encourage the fishery and the local trade in what the fishermen can handle in fresh, smoked and pickled condition is about the limit of the market. The alewife fishery was once a prolific source of revenue for many farmer-fishermen during the early spring weeks before farming was begun. This fish was reported to be very plentiful in the spring of 1926, and after the fishermen had ceased operating, because of farming operations coming on, there was some demand from the St. John market, but the nets had been taken up and put away and further operation was not carried on.

BASS			
Year		Cwt.	Value
1925.....		7	\$ 105 00
1926.....		212	3,816 00

Bass is the mystery fish of this district. The figures above will indicate about what happens every twelve or thirteen years. The last fairly respectable catch was in 1914, and in the interval very few bass are taken. Practically the whole catch comes from the Belleisle bay, an indenture about ten miles deep inland from the St. John river. Few other fish are ever taken in that water. This is wholly a winter fishery, and would be of considerable value to the farmers

along that water if the fishery would only hold out from year to year. It would be interesting to learn why bass come to this water in numbers only at long intervals.

EELS			
Year		Cwt.	Value
1925.....		60	\$1,020 00
1926.....		30	114 00

While the quantity of eels taken in 1926 was reported as 50 per cent less than the quantity taken in 1925 the price per cwt. went to pieces completely. In 1925 Overseer Bell quoted the price as \$17 per cwt., while the price quoted in 1926 is only \$3 per cwt. One might wonder why the fishermen bother with this fishery when the price is so low, but it is the practice for the fishermen to catch and hold eels in floating crates until the weather becomes cold in the autumn, so that there will not be so much need for ice to preserve the fish in transit. Consequently it is more or less a future market, and the market may be bad when time to ship comes, and this appears to have been the case in 1926.

MULLET			
Year		Cwt.	Value
1925.....		342	\$1,026 00
1926.....		224	672 00

Mullet appear to have been taken in smaller quantities than in 1925. This is a sort of side-line, the fish being taken mostly in alewives and pickerel nets while fishing for the latter. Some are taken otherwise for eel bait, which I think mullet is more suitable for than anything else.

PERCH			
Year		Cwt.	Value
1925.....		Nil	Nil
1926.....		15	\$45 00

A few perch are taken in the pickerel nets in the early spring, autumn and winter, also some in the alewife nets in the spring, and a fairly ready sale is found amongst the Jewish people, mostly. This fish is considered very good for table use, taken when the water is cold.

PICKEREL			
Year		Cwt.	Value
1925.....		392	\$3,920 00
1926.....		368	4,416 00

While the catch of pickerel dropped off a few cwt. in 1926, the price quoted is \$2 per cwt. better than in 1925, and the total makes a considerable distribution of cash amongst the people who take this fish. Most of them are taken when the weather and water is cold, and the work is rather unpleasant, but is carried on when other work is not pressing, and it adds a little money to the purses of the farmers who do not leave their homes for lumber or other work, and when perch are taken at the same time, it helps at a time when the average farmer has little other revenue coming in. A considerable quantity of pickerel find a fairly ready sale amongst the Jewish population and some are exported.

SALMON			
Year		Cwt.	Value
1925.....		546	\$13,650 00
1926.....		552	13,800 00

Taking into account the fact that my district was enlarged in 1926 it will be observed that the total commercial salmon fishery was practically the same as in 1925. However leaving out the added district there was a small decrease, as

the added district did not add very much to the catch in 1926, and the decrease for the older district was 14 cwts. While 14 cwts. is not very much on the total, either gained or lost, I should prefer to have it on the other side of the score. The 20 cwts. credited to the non-tidal water of the Miramichi river, Northumberland county (the addition to my district in 1926), is the legal catch, and what is considered the maximum illegal catch, and Overseer Parks does not deny that some were taken illegally, but the quantity was a mere trifle compared with what it has been in past years. An analysis of conditions in my former district shows that in 1926 there was a slight falling off in Kings and Queens counties; a very considerable falling off in Sunbury county; a fair per cent of gain in York county; a slight fall in Carleton county, with a few more fish taken in Victoria county, the losses in four counties being 40 cwt. and the gains in two counties 26 cwt. A small gain or loss, and sometimes a large gain or loss, may easily be accounted for because of water conditions, if the up or down does not carry over too long a period continuously, for instance, on the lower St. John river, Kings county particularly, the nets do not get good catches of salmon in the early season as this fish seems to travel up river fairly fast and keeps well out in the river and the nets do not take many, then, should the river go low, and stay so for a good portion of the fishing season salmon again keep off shore and miss the nets in this region. Queens county has never, with the water at any stage, shown a production of salmon of consequence.

The elevation of the river in Sunbury county in the fishing season shows the same effect as it does in Kings, apparently the fish following the deeper water during the high and low periods, and when the water is of medium height it appears that they follow closer to the shores. I suppose that the same applies to Queens county, but there does not appear to be any, or many, even fair fishing stands at any stage of water in that county. A decrease of 17 cwt. in 1926 in Sunbury county is a very heavy falling off in that comparatively short area of water, and were it not for favourable returns in other areas I would think that it might begin to look serious. However in 1923 the catch was light, while 1924 and 1925 were very good. York county shows a very fair per cent increase while the catch in Carleton county shows a small decrease, although very good, taking into consideration the fact that this is non-tidal water with only thirty days fishing on an average, with varying conditions of water. The catch in Victoria county is of no or little importance any year, but 1926 was better than the previous year. The months of June and July were better periods than the month of August in the non-tidal district. The first fresh-run salmon that I have record of being taken was in the first week of June, 1926, while in 1925 there was a good run of fish before the 20th of May. There was a fair percentage of large salmon, from fifteen to twenty-five pounds each, last season. On the non-tidal portion of the Southwest Miramichi river in Northumberland county (the first year that it has been part of my district) the legal catch in the commercial fishery was very discouraging to the fishermen considering the number of permits issued, and I have very good evidence that the illegal catch was quite as discouraging. With the area of water and conditions which have existed for longer than I can remember, and the comparatively long stretches of water each fishery guardian has to patrol, and some of the guardians not the most efficient, it is quite impossible to prevent some illegal work. I should like to make it plain that to Overseer Parks is due most of the credit for the fairly satisfactory conditions there in 1926. From information I have been able to gather the quantity of salmon, mature fish, in the Miramichi river in 1926 was comparatively small, at least that is the testimony of the commercial fishermen on the non-tidal water, and part of the tidal water netters whom I met, and the testimony of the anglers without exception, and the grilse were, on the average, very small, a large percentage of them

weighing from less than three pounds to about four and one-half pounds. A very large quantity of these small fish were brought into the central part of the province for sale by truck or auto, and a quantity were seized and confiscated because of being under the three pound limit, and I was advised by several of the hawkers that they could have bought many smaller fish offered by the fishermen but refused to do so when they found that they would not be allowed to sell, or have them in their possession, if apprehended by a fishery officer, and in addition the undersized, and probably the whole load, would be seized together with the conveyance, with a prosecution following. I have as good evidence as it is possible to get that the illegal size fish were not taken in the non-tidal water district. Possibly there is a reason for the excessive number of very small fish (grilse) running in the Miramichi river and the reported scarcity of salmon (mature fish). I am not prepared to offer a reason.

SHAD		
Year	Cwt.	Value
1925.....	1,902	\$11,412 00
1926.....	720	4,320 00

I now come to a matter that may cause some questionings. The excessive falling off in the catch of shad does not look good, and I am not sure that it can be explained satisfactorily. A drop of 1,182 cwt. in one year is difficult to explain. The subdistrict officers have explanations, and they pretty well agree as to the cause of the light catch of shad in 1926, and while the reduced catch may look serious at the present time, and may need correcting in some way in the future, there appears to be nothing to do but wait for further evidence, and that can only be had through further experience. What is to me a somewhat relieving feature is the information that the catch of shad in St. John harbour was heavy in 1926. Overseer Bell reports that shad had reached his district by the 10th of May, 1925, while the first that he knows of being taken in 1926 was on May 31, about three weeks later, and at that time he states shad were selling in the St. John market for fifteen cents per fish. Therefore his version of the greatly reduced catch in 1926, amounting to 965 cwt. in his district alone, is because of the backward spring, continued high water and a poor market, and shad arriving only about June first, the fishermen had not more than twelve nights to operate. In 1925 there was a special opening of the shad fishing season on May 9, which gave the fishermen a long season, with a consequent comparatively heavy catch. In Sunbury and York counties this fish was still later reaching the fishing areas, and a still shorter season to operate, and the fishermen reported the water too high. The reduced catch in these two counties amounted to 148 cwt. or from 180 cwt. in 1925 to 32 cwt. in 1926. Shad is not fished for in Carleton county water, with the exception of one operator some seasons, and only a small quantity is taken in the salmon nets, set for salmon only. The very late run affected the catch in Victoria county to a greater degree than in the lower water, and the catch fell from 74 cwt. in 1925 to 5 cwt. in 1926, the legal fishing season closing before the only three fishermen in that county had time to operate with any success. The officers and the fishermen without exception state that there appeared to be plenty of shad in the rivers, but because of conditions noted they were unable to get them in their nets. I only hope that the versions are true, and I have no reason to question the statements of all these men. Considerable quantities of shad are brought into the central part, and may be the southern part of the province from the Miramichi river district for sale, and this, no doubt, helps to lower the price to be obtained by the St. John harbour and river fishermen, and the consumers no doubt appreciate that phase. I would be sorry to see the time when it would be considered necessary to again wholly restrict the fishermen

of this district from taking some shad each year, and I trust that conditions are not again leading up to that. Rather than see that I would strongly advise, if necessary, the reducing of the netting privilege now allowed, which could be done in Kings and Queens counties, where two nets are used by many families, and allow only one net per family, but I trust that this will not be necessary. No shad are taken in the non-tidal parts of the Miramichi waters.

STURGEON			
Year		Cwt.	Value
1925	.....	42	\$1,050 00
1926	.....	57	1,425 00

The catch of sturgeon was about normal, but a little better than the 1925 catch, with the per cwt. value the same as the previous year; while about 100 pounds of caviar were sold, at a comparatively low price per pound.

The total weight and value of the commercial fisheries of this district during the years 1925 and 1926 are as follows:—

Year		Cwt.	Value
1925	.....	3,975	\$34,235 00
1926	.....	2,936	30,930 00

a decrease of 1,039 cwt. and \$3,305 in 1926.

MATERIALS			
Year			Value
1925	.....		\$14,425 00
1926	.....		15,185 00

The total weight and value of the domestic fisheries in this district for the years 1925 and 1926 are estimated as follows:—

DOMESTIC FISHERIES			
Year		Cwt.	Value
1925	.....	454	\$ 8,780 00
1926	.....	648	13,120 00

The very substantial increase in 1926, of 194 cwt. and \$4,340, which includes the non-tidal waters of the Miramichi river in Northumberland county for the first time, is satisfactory, while the rods and lines and canoes used by anglers in 1925, exclusive of the added territory, were valued at \$16,560, with the added territory in 1926 the same was valued at \$17,332.

The trout fishery seems to have been about an average on the whole. The ordinary brook trout is reported to have been rather scarce, but that apparent condition may have been due to the cold, backward spring, and high water continuing a considerable period in the early summer. Sea trout were said to be much more plentiful in the non-tidal district of the Miramichi river. It appears to me that I can observe a considerable change in the sentiments of the average angler, particularly in the counties of York and Carleton, regarding trout fishing. Formerly practically all anglers were quite enthusiastic if they could be assured of fairly good trout fishing within a reasonable distance of their homes, and if they could have good sea trout fishing they were more than pleased, but now, and this refers more particularly to the residents of the cities, towns and villages, they want nothing less than good salmon angling, and are not satisfied with good grisle fishing even, but there are a great many persons who cannot afford the time to go after salmon and spend two or three days or more and outfit with expensive rods and lines, etc., and probably have to employ a guide, and such people, if they fish at all, must depend upon the trout streams for their angling pleasure. Consequently it is encouraging to them to know that the department is using much effort to keep the streams and lakes supplied with trout.

It is with considerable satisfaction that I am able to report a fairly successful salmon angling season, generally speaking. This sport on the St. John river was not better than ordinarily is the case, but this river has not yet proven itself a reliable angling water. Under exactly right conditions it is possible to take a great many salmon with the fly from this water. This happened in 1923, when it appeared possible to take salmon with a fly at many places between Fredericton and Grand Falls, and take many of them, but it never was so before nor since, in my experience. The non-tidal portion of this river is fairly large, and while there are many pools, and other likely places, where it might appear that salmon do, or would, stop for rest and cool water, the fact remains that salmon do not, generally speaking, rise well to a fly. The river never gets so low but that salmon can pass along up at any stage of water without any trouble, and I think they move along faster towards the upper, or breeding waters, than they do in some other and smaller rivers. The 1923 season referred to was exceptional in that there was a very heavy freshet the latter part of June and early July and the water was not at all normal. Every evidence shows that there were lots of salmon passed up the St. John river in the 1926 fishing season. Coming to the Tobique river, and the angling interests there, there is a better story to tell. It is the united judgment of the Tobique Salmon Club, the Ogilvy Brothers, and the Messrs Frasers, besides the owners of private angling pools, that such salmon angling has not been enjoyed on that water in the history of modern angling. The Tobique Salmon Club has been established there about thirty-five years, and to their credit be it said they have practically made good angling there by the employment of a large force of guardians and strict enforcement of the law. Their report is that 1926 was the best season, by long odds, in their experience. To me there is only one cause for this condition, and that is nature was kind. So far as assisting the salmon up the St. John river, to reach the Tobique, the assistance of your officers and guardians was not greater than it has been for a number of years, i.e., since the service was taken out of the slough it was in previous to 1918. Your officers and guardians did not work harder in 1926 than they have been doing for some years. As has previously been stated, the Tobique Club angling is confined practically to the months of June and July, after which their camps are closed, which makes a short season, and they need a good run of salmon during the months of May and June, which we evidently had in 1926, and providence is to be credited with that, and the apparent satisfactory conditions after salmon reached that water. Outside of some privately controlled and expensively and strictly protected water. I do not think it possible to give a river the size of the St. John better protection than this river is getting in recent years without considerable enlargement of the protective force, and at an expenditure that might seem unwise. The illegally killed salmon on the St. John river in recent years is, in my opinion, negligible.

Coming to the Southwest Miramichi river and tributaries I have a different but fairly favourable story to tell regarding matters in connection with the non-tidal portions. Generally speaking conditions in this area have been anything but good. Only one year that I can recall, and that was 1923, when conditions were alike on the St. John and Miramichi rivers because of a large freshet in late June and early July, have salmon anglers generally on the upper waters had a fair show, not because there were not considerable quantities of salmon and grilse in that water and trying to reach the upper water, but other interests prevented. Conditions have been too well known to require lengthly comment, and this water, as well as Overseer Parks and his fishery guardians, having been added to my district in 1926, it was up to me to try to show that something better was to be had, and I am very pleased to be able to say that there was an apparent improvement, and the Protective Associations and anglers generally in the upper Northumberland, York and Carleton county districts have not been reluctant in expressing their appreciation of conditions in 1926. As previously

written into this report, the quantity of grilse, with the individual fish being rather small, reaching the upper waters appeared to be excessive as compared with the quantity of mature fish, but it was a fact for which I am unable to account. I shall say this, and aware of what I am saying, that the mature fish were not unduly sorted out by the nets in the non-tidal water, and it would appear to me that the trap-nets in the tidal water were not responsible for the scarcity of large fish in the upper waters, and I can only think that there must have been a comparatively small run of large fish in that water in 1926. I am advised by Mr. William Griffin, the President of the New Brunswick Guides' Association, who has fishing lodges on the Miramichi river, in York county, that while his guests—foreign anglers—got comparatively few salmon they had all the grilse fishing they wished, with most satisfactory results, and the Carleton Branch of the New Brunswick Fish and Game Protective Association expressed appreciation regarding the angling in Carleton county in 1926. If this result was attained by consistent and hard work I wish to say that my part in it was small. I advised and urged for better protection in this new part of my district, and gave otherwise what little attention I could spare from my office to the work there. While we had one extra fishery guardian in that area I do not know that we had a better class of men than were there other seasons. Consequently I have got it down now to where the real effective work was done, and that is to Overseer Parks' hard work; not only to his personal patrol, but to his insistence that his fishery guardians give proper attention to their work so far as it was in his power to do so. The result was not attained by any special act of Providence, so far as favourable water conditions were concerned, as the river was low much of the season without any freshet during the season until October, which was too late to affect angling. Much illegal work was attempted, but it was checked quickly, and comparatively few fish were illegally taken, and I may add the legal catch, with 49 permits issued on the sixty miles of water, was disappointingly small to the gill-net fishermen. The gill-nets on the non-tidal water of the Miramichi river, if controlled as the law requires, will never greatly affect the quantity of salmon and grilse reaching the upper or angling and spawning areas, and only a poor run of fish, or unnatural nature conditions, or ineffective protection, will prevent a large number of salmon or grilse, or both, reaching the upper waters.

#### FISHWAYS

The fishways in this district are reported to be in satisfactory condition, but several of them are of none or little value.

#### PROSECUTIONS

Prosecutions during the year numbered twenty-eight, as follows: 14 for illegal fishing with nets of various kinds, 4 for handling (having for sale) salmon illegally killed, 2 for killing fish with explosives, 1 for fishing salmon with spear and torch, 1 for assault and 6 for water pollution.

Fines to the amount of \$885 were imposed by civil magistrates. Fines to the amount of \$205, part of which were imposed previous to 1926, were paid, and fines to the amount of \$560 were suspended for the present, and two cases where fines of \$100 and \$50 were imposed are being appealed.

#### CONFISCATIONS

Fifty-one seizures and confiscations were made, and included in the materials are one Ford truck, two Ford automobiles, and over thirteen hundred pounds of salmon, the balance being illegal gear such as twine nets, wire netting for salmon traps, old boats and spears and torches, the whole having an approximate value of \$1,000.

Sales to the value of \$209.45 were made, much gear destroyed, being of no value for sale, or inadvisable to sell it in the district where seized, and a small amount still held for sale when it is possible to dispose of it.

The total amount of revenue collected and credited to the Receiver General during the year was \$844.45.

# REPORT OF S. T. GALLANT, INSPECTOR OF FISHERIES, PROVINCE OF PRINCE EDWARD ISLAND AND MAGDALEN ISLANDS FOR 1926

The total marketed value of the fisheries of the Province of Prince Edward island for the year 1926 was \$1,358,934, a decrease in that of 1925 of \$239,185.

The following table is interesting as showing the comparison of the catch and value of the year 1926, and that of the preceding year:—

		1925		1926	
		Quantity Caught	Value Marketed	Quantity Caught	Value Marketed
			\$		\$
Cod.....	cwt.	61,483	150,135	49,823	116,616
Haddock.....	"	968	1,652	1,472	3,065
Hake and Cusk.....	"	14,939	22,981	13,803	20,881
Mackerel.....	"	6,220	23,246	6,054	20,653
Herring.....	"	64,942	83,703	63,930	89,915
Halibut.....	"	21	210		
Alewives.....	brls.	84	225	360	720
Salmon.....	cwt.	90	1,800	164	4,015
Smelts.....	"	17,595	142,496	15,390	98,670
Trout.....	"	107	1,328	111	1,332
Albacore.....	"	975	4,875		
Caplin.....	brls.	138	552	157	628
Eels.....	cwt.	320	3,311	192	2,162
Tom Cod.....	"	2,555	6,336	2,331	4,664
Clams and Quahaugs.....	brls.	1,560	9,758	867	4,533
Oysters.....	"	5,278	52,780	5,161	61,898
Tongues and Sounds.....	cwt.	48	960		
Cod Liver Oil Medicinal.....	gal.	25	50	30	45
Cod Oil.....	"	7,030	2,109	5,730	1,719
Fish Oil, other than Cod Oil.....	"	1,800	900		
Lobsters.....	cwt.	78,570	1,088,712	66,298	926,718

## COD

West Prince county shows an increased catch over that of last year of 3,120 cwt.; East Prince county, an increase of 172 cwt.; Queens county a decrease of 9,171 cwt., and Kings county a decrease of 5,781 cwt. The decrease may be attributed to the rough weather prevailing during the entire season. The dog-fish nuisance is also responsible for the large decrease in Kings county.

## HAKE AND CUSK

West Prince county shows an increase over that of last year of 2,758 cwt.; Queens county a decrease of 1,295 cwt.; and Kings county, a decrease of 2,599 cwt.

## HERRING

West Prince county shows a decrease of 315 cwt.; East Prince county, an increase of 15 cwt., Queens county an increase of 1,329 cwt., and Kings county a decrease of 3,941 cwt.

## MACKEREL

On account of the small prices offered for fresh mackerel this fishery was not carried on to any extent. There is a decrease in the total catch of 166 cwt.

## SALMON

This fishery was carried on at St. Peters and a beginning was made on a small scale at Winter River, a tributary of Tracadie bay. This fishery will be further developed in the near future, especially in Richmond and Alberton bays. There was an increase in the total catch of 74 cwt.

## SMELTS

The season opened for gill-net fishing on October 15 and good catches followed throughout the season. Bag-net fishing opened on December 1, but on account of mild weather this method of fishing was delayed until the last of December when the ice made. Bag-net fishing has not been so successful as last year.

## LOBSTERS

Due to unfavourable weather at the beginning of the season the catch on the north shore was a disappointment to both fishermen and packers; on the south shore, however, that is, from Souris to Victoria, the catch was about normal.

The lobster fishery is by far the most important in this Province, affording an annual revenue of from \$1,000,000 to \$1,200,000, and every protection possible should be given it in order to assure a successful future. In the last few years what are known as jumbo lobsters, that is, lobsters from five to twelve pounds in weight, have been taken in large numbers, and as these are largely the reproducing factors in the industry, it is to be feared that this practice if allowed to continue, will have a disastrous effect on the industry. Also, a very large number of immature lobsters measuring in length from three and one-half to six inches are being taken by the fishermen. Although both fishermen and packers make a profit for the time being on these lobsters they will undoubtedly lose out in the end, for it will be impossible to expect an increased catch if this practice is continued.

A lobster six inches long, and four years old, after being boiled weighs four ounces, while a lobster five inches long, and three years old, after being boiled, weighs about two ounces. It would appear, then, that these small lobsters will about double their weight in one year's growth. I am of the opinion that it would be in the interests of the Maritime Provinces to agree in establishing at least a six-inch limit. Jumbo lobsters weighing over four pounds cannot be sold alive; consequently they are boiled and have to be cut up to be packed in the can. The meat is of an inferior quality and this means the placing on the market of very undesirable product.

In West Prince county the decrease was 4,178 cwt.; in East Prince, a decrease of 1,276 cwt.; in Queens county a decrease of 3,423 cwt.; and in Kings county a decrease of 3,395 cwt.

## OYSTERS

There is a small decrease in the total catch of 117 barrels, but an increase in the market value.

The buyers are taking special care to select oysters to meet the demands of the markets, good prices were maintained throughout the season, and it appears that the markets could have absorbed a much larger quantity of these

shell-fish. East River and tributaries, West River and tributaries, Seal and Vernon Rivers, are well stocked with small oysters and we are now assured of an annual yield of about 5,000 or 6,000 barrels from these areas. It is pleasing to note that a small beginning has been made to fish oysters in the Richmond Bay area, some 14 barrels having been taken.

There are unlimited possibilities for the oyster industry in this province if the proper methods of oyster culture were adopted. A thorough survey should be made of all the areas in the different rivers of this province and oyster culture should be undertaken under scientific instruction. If this were done it is probable that the export could be increased from 5,000 to 40,000 or 50,000 barrels per season. From observations of some of these areas last summer it was ascertained that oyster fry will not survive on silted bottoms, so that a system of cleaning the oyster areas should be undertaken as soon as possible. This work should be carried on in the month of June as oysters spawn on or about the middle of July.

## FISHERIES PROTECTION SERVICE

Some attempts were made at illegal lobster fishing, but there was a strong fleet of patrol boats on duty which were fairly successful in preventing fishing being carried on to any extent. This system of protection has proved the most effective in recent years.

Total Number of Confiscations for violations of the Fishery Regulations during the year 1926, covering 67 seizures.....	32
Total Number of Prosecutions.....	14

## REMARKS

The fishways built in 1925 at Laird's Milldam, Campbell's Milldam, Dixon's Milldam, and at Vernon river, are proving a success and should improve trout fishing in these streams. It is to be hoped that several fishways will be built in other dams throughout the province as trout fishing is carried on very extensively both by our residents and tourists, the latter increasing in number from year to year. As trout are our only sport fish during the summer months, everything possible should be done for their propagation.

## MAGDALEN ISLANDS

The total marketed value of the fisheries of the Magdalen islands for the year 1926 is \$623,175, a decrease in that of last year of \$82,637.

The following table gives a comparison of the catch and value of 1926 and that of 1925:—

Kinds of Fish	1925		1926	
	Quantity caught	Value marketed	Quantity caught	Value marketed
Cod.....	cwt. 70,020	171,380	38,892	87,010
Herring.....	" 153,780	90,106	126,620	84,552
Mackerel.....	" 41,105	109,894	17,595	64,823
Smelts.....	" 40	120	50	250
Eels.....	" 20	140	30	240
Clams and Quahaugs.....	brls. 2,700	16,300	1,975	11,500
Lobsters.....	cwt. 21,601	311,038	25,375	375,743
Squid.....	brls. 75	750	25	250
Tongues and Sounds.....	cwt. 25	175	40	280
Cod Oil.....	gal. 8,781	3,410	6,700	3,850
Seal Oil.....	" 2,604	1,354	3,500	1,750
Marine Animals, Seal.....	912	1,185	1,200	2,400
Fish skins.....	cwt. "		200	500
Fish bones.....	" "		300	75

## COD

The demand for cod was poor, consequently this fishery was not carried on to the same extent as last year. Good catches were made during the month of June, but in the months of July and August one hundred and sixty fishermen left the Islands to hire with the Wayagamack Pulp Company, of Anticosti; consequently, a decreased catch of 31,128 cwt. is the result.

## HERRING

Due to ice conditions herring fishing did not begin before the 15th of May, and at this late period the usual number of vessels did not call for supplies.

There was a decrease of 27,160 cwt. A large quantity of the catch was smoked and as the Magdalen islands are noted for putting up a superior quality of this fish, the demand was good and good prices were realized.

## MACKEREL

There is a decrease in the catch of 23,510 cwt. Much better prices were obtained for mackerel this season as the fish were of a superior quality. The catch was small and special care was taken in the curing process.

## LOBSTERS

There is an increase in the catch of 4,774 cwt. notwithstanding the fact that ice conditions delayed fishing operations some seven or eight days later than last year. Complaints have been made to the fishery overseers of the destruction of lobster gear by the fishermen themselves. In the last two or three years fishermen have set in fifteen or twenty trap lines without anchors, and when these traps were being overhauled they very often drifted across another man's line; in turn, when this man had occasion to haul his gear and found a line of traps over his he had to cut the traps in order to free his own gear. It is evident then that this practice is becoming a real nuisance.

It might be advisable to have a change made in the Regulations to the effect that lobster lines should be anchored at each end.

## REMARKS

Navigation with the Magdalen islands opened on May 3, the steamer ss. *Lovatt* making her first trip there on that date. This boat is giving entire satisfaction so far as passenger and freight service are concerned, and the captain and crew are very obliging and most attentive to their duties.

### REPORT OF J. B. SKAPTASON, INSPECTOR OF FISHERIES, PROVINCE OF MANITOBA, FOR 1926

The year 1926 has been a banner one both as to catch and prices obtained, surpassing the previous year by more than eleven million pounds of all fish with an increase of \$872,193 in market value.

	Quantity	Value to Fishermen	Value as Marketed	Number Men Employed
	Cwt.	\$	\$	
1923.....	154,090	739,321	1,020,595	2,526
1924.....	177,898	886,410	1,232,563	2,828
1925.....	190,240	1,061,331	1,466,939	3,390
1926.....	305,830	1,744,642	2,328,803	3,809

This is very definite increase, and out of all proportion to the increased number of operators. The increase in production is spread pretty well over the entire province, and in nearly all the principal varieties of fish, goldeyes, perch, pickerel, pike, trout, tullibee and whitefish, show a relatively heavy increase, while only in two varieties, catfish and sturgeon is there an appreciable decrease.

## MARKETS

Market conditions have been good for the whole of the production.

The following are comparative prices as marketed of the more important varieties for the last four years:—

	1923	1924	1925	1926
Catfish.....	10.0	11.1	10.6	11.3
Goldeyes, fresh.....	4.0	3.8	4.2	4.0
Perch.....	5.1	7.2	11.2	13.4
Pickrel.....	7.1	8.5	11.5	10.3
Pike.....	3.7	3.5	4.0	4.0
Sturgeon.....	47.3	50.0	40.9	51.6
Trout.....	7.5	10.0	9.0	11.1
Tullibee.....	5.2	3.6	4.2	5.9
Whitefish.....	7.2	9.5	9.5	9.0
For total catch.....	6.6	6.9	7.7	7.6

*The sub-district of The Pas.*—Comprising all waters north of and including the Big Saskatchewan River, but not the northern part of Lake Winnipeg, has enjoyed a good season in all varieties of scale fish. Sturgeon however was a very decided disappointment both in the Nelson River and the Big Saskatchewan waters. In the former, where the Armstrong Independent Company operate exclusively between Cross Lake and Kettle Rapids, the following shows the annual decrease for three years:—

1924	1925	1926
85,000 Lbs.	65,000 Lbs.	45,000 Lbs.

In 1924 fishing was stopped early in August because the company's allotment of the 100,000 pound limit for the river had been taken. These years show practically a relative falling off in sturgeon production in the waters of the Big Saskatchewan. There was practically no commercial sturgeon fishing carried on in the Churchill during the winter of 1926. Three licenses were issued for the vicinity of Pelican narrows. These three between them barely had a one man outfit of nets, and only 2,100 pounds of sturgeon were brought out.

The winter operations for small fish was fairly successful, and in view of the fact that the majority of the operators are not entirely fishermen but divide their time between fishing and trapping, the season may be considered a fruit-

ful one. As the statistics give the returns for The Pas under one heading only, it may be of interest to show here the distribution by lakes:—

Lakes	Number of men	Whites	Pickereel	Trout	Pike	Tullibee
		Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Moose.....	12	1,292	381	55	97	10
Pelican.....	5	913	6			
Egg.....	5	796			6	
Cormorant.....	7	328	271	19	104	52
Sturgeon.....	1	20	36	2		
Beaver.....	3	704	28	103	3	
Lost.....	1	9	56		35	12
Trout.....	2	170	30		25	
Herb.....	9	377	453		44	
Clearwater.....	9	406		134		
Running.....	8	226	56	77	113	
Athapapuskow.....	2	40	3	9		
Reed.....	1	47	6	18		

A great deal of interest is evidenced by fishermen in the opening up of new fishing waters with the completion of the Hudson's Bay Railway. Judging by the inquiries coming into this office a considerable influx may be expected to these northern waters, as well as to the bay itself.

*Lake Winnipegosis.*—The catch in this lake shows a very definite improvement, both summer and winter, and while there is some increase in number of men fishing, the individual catch was much greater for 1926 than 1925.

	1924		1925		1926	
	White	Pick	White	Pick	White	Pick
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
Summer.....	1,316	6,323	926	5,084	1,458	10,556
Winter.....	6,908	8,872	5,289	8,464	6,879	14,673
Total.....	8,224	15,195	6,215	13,548	8,337	25,229

*Lake Manitoba.*—This lake had possibly the best year in its commercial fishing history, the total catch exceeded the previous year by nearly three and one-half million pounds, the average price obtained was slightly higher and the catch per man exceeded any previous year.

	1923	1924	1925	1926
Number of fishermen.....	626	779	905	1,128
Total production.....	Cwt. 25,655	Cwt. 48,658	Cwt. 51,587	Cwt. 85,256
Catch per man.....	41	62	57	76

The increase over the previous year is spread fairly well over all varieties of fish produced, pickerel showing an increase of over one million pounds, tullibee approximately the same, pike three-quarters of a million, and perch three hundred and eighty thousand pounds.

This lake is served by railways on both sides to its very northern limits, for that reason it lends itself particularly well to the fresh fish industry, which is becoming ever more popular. Prices obtained by this method of marketing are much higher, and cost of freighting and other operations less. This naturally attracts an ever increasing number of fishermen to the lake. The congestion of nets has become quite a problem as well as a source of danger to the future of the lake, even if such is not evidenced by the above quoted figures.

*Lake Winnipeg.*—This lake has more than kept pace with the other waters of the province in increased production. Only sturgeon and catfish show a decrease. All other varieties show a very large increase, with only a small increased number of fishermen operating. The total increase of all fish for 1926 as against 1925 are shown by the following figures:—

	1925	1926
	Cwt.	Cwt.
All fish.....	84,763	141,726
Winter and summer operators.....	1,791	1,828

The summer whitefish catch was the best in years. The limit of 3,000,000 pounds was slightly overtaken and all nets lifted a week before the season closed. The following are comparative figures for six summer whitefish seasons:—

1921	1922	1923	1924	1925	1926
Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.
29,271	24,724	14,554	12,311	20,185	30,041

It will be noted that the statistical returns show the quantity of whitefish as 33,115 cwts. The difference is accounted for by whitefish taken during the fall pickerel operations. Perhaps the most encouraging feature of the whitefish situation during last summer's operations was the generally equal distribution of the fish all over the northern areas of the lake, even to the south of Swampy Island.

The pickerel catch during fall and late summer fishing was also very good, the best in years, as indicated by an increase as follows:—

	Cwt.
1925.....	10,626
1926.....	22,860

The greatest increase of all is in the tullibee catch, the run came on fully two weeks earlier than usual, with the result that very large quantities of this fish were taken during the latter part of the pickerel fishing. The figures for the two years are as follow:—

	Cwt.
1925.....	3,404
1926.....	16,620

The winter season also shows marked improvement in all the above mentioned varieties.

It is regretted the same encouraging report cannot be submitted regarding the sturgeon fishing situation on Lake Winnipeg, that has characterized this report on all other varieties of fish. Taking the figures of sturgeon production for the last three years as a basis, there seems reason to fear that here also

this valuable fish may be facing the fate it has so generally met with elsewhere. The following are figures for three years:—

	Cwt.
1924.....	886
1925.....	697
1926.....	309

I believe the time has come when serious consideration should be given the necessity of closing the lake for sturgeon fishing during a period of years.

During the year there were 42 prosecutions in the district for the following violations of the Fisheries Act and Regulations:—

For fishing without a license.....	10
For fishing without a permit.....	2
For refusing to place identification on nets.....	1
For obstructing streams.....	1
For using illegal mesh.....	9
For using excessive fishing gear.....	1
For possession in close season.....	6
For fishing in close season.....	4
For operating a fish trap.....	2
For spearing fish.....	2
For fishing in closed area near St. Andrews Locks.....	4

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There were also 163 confiscations during the year.

Wm. A. Found, Director of Fisheries, visited the district early in April with a view to holding conferences with fishermen and dealers. Well attended meetings were held at Selkirk, Winnipeg and Winnipegosis. The Fishery Regulations were thoroughly reviewed at these meetings and many valuable suggestions made for amendments which are now under consideration.

#### REPORT OF G. C. MACDONALD, INSPECTOR OF FISHERIES, PROVINCE OF SASKATCHEWAN, FOR 1926

During the year there has been a total commercial production of fish in the Province of Saskatchewan of 56,715 cwts. This is a decrease from the previous year of 5,076 cwts. Whitefish decreased 7,311 cwts., and Trout 40 cwts., Pickerel increased 22 cwts., Pike 201 cwts., Tullibee 1,460 cwts., Sturgeon 15 cwts., and the coarser species 397 cwts.

#### WINTER SEASON

During the winter commercial fishing season the production was 52,424 cwts. This is a decrease of 4,983 cwts. There was a decrease of 6,868 cwts. of whitefish; 101 cwts. of trout; 101 cwts. of pickerel; while the following increases were recorded in the coarser species—Tullibee 1,317 cwts.; Pike 174 cwts.; Mullet 343 cwts. and mixed fish 73 cwts.

The decrease in the production of whitefish has been general on all waters except Jackfish Lake, Ile a la Crosse Lake, Okemasis Lake and in the Montreal Lake District. Peter Pond Lake shows a decrease of 5,278 cwts. This was chiefly due to only one company operating during the season and also owing to operations ceasing early in January. Dore Lake shows a decrease of 952 cwts., and Lac Des Isles and Pierce Lake 105 cwts., Makwa and Worthington Lakes 623 cwts., Waterhen Lake 271 cwts., Turtle Lake 894 cwts., Green Lake 191 cwts., Long Lake 124 cwts., and Jackfish Lake 350 cwts. Ile a la Crosse Lake shows an increase of 1,143 cwts. of whitefish; Okemasis Lake 161 cwts., and Montreal Lake District 76 cwts; Lac la Ronge 506 cwts. The decrease in the production of whitefish is attributable to the changeable weather conditions

during January and February when the fishermen had to be continually changing their fishing grounds from deep to shallower waters and in some instances nets were too deep to be operated successively in the shallow waters, and some nets were destroyed by the cork lines freezing to the ice. At certain periods of mild weather, fish could not be properly packed and for days at a time nets were kept out of the water. On some lakes fishing conditions were not of the best during December owing to the heavy fall of snow before the ice was properly formed, resulting in the ice cracking and causing a deep slush on the ice. In districts such as Ile a la Crosse, Montreal Lake and Lac la Ronge where increases are shown, this is due partly to an increase in the number of fishermen operating and partly to the fact that no slush had to be contended with. Of the coarser species of fish there is an increase of 1,317 cwts. of tullibee. Of this amount Peter Pond Lake accounts for 638 cwts., Minitikiwan Lake 388 cwts., and Dog Lake in the Okemasis Lake district 11 cwts. The further increase of 1,581 cwts. of the coarser species, consisting mainly of Pike, is reported due to the shallow water fishing carried on.

There were 1,319 cwts. of fish shipped in a green state during the winter season.

#### SUMMER SEASON

During the summer commercial fishing season the production was 4,291 cwts. This is a decrease of 93 cwts. from the previous year. Approximately the same number of men operated as in the previous season. The summer limit of 200,000 pounds was reached on Long Lake on July 10th. The limits at Turtle and Makwa Lakes were not reached at the close of the season and very little fishing was carried on at these lakes during July and August owing to the declining market. Jackfish Lake shows a small increase and Okemasis Lake a corresponding decrease.

#### MARKETS

The total market value of the year's commercial production was \$444,288. This is a decrease from the previous year of \$50,594, and is chiefly accounted for by the smaller production. The price obtained for whitefish was practically the same as the previous year. Trout increased approximately one cent a pound in value, and the coarser species, such as pike, pickerel and tullibee, were about the same as last year.

During the summer season the opening markets were quite favourable, but during the latter part of June prices declined to such an extent that fishermen operating on lakes situated distances from the railroad were compelled to cease operations.

Prices obtained during the winter were fairly steady and shipments were not held up for any considerable time and practically no fish were stored during the spring.

All fish shipped from the lakes tributary to Prince Albert and Big River are packed in regulation fish boxes. A large amount of fish are still shipped in sacks, from the Battleford district, which command a smaller price on the market.

#### CONDITION OF THE FISHERIES

The general condition of the fisheries throughout the Province might be considered as favourable. Very few new lakes have been opened up, due probably to the cost of construction of roads leading to them. Operations have increased on such lakes as Ile a la Crosse and Lac la Ronge, both showing an

increase in production. Dore Lake, which has been a heavy producing lake for years, shows a slight decrease in the catch of whitefish, while other species have increased some.

Long Lake, on which there is both a summer and a winter limit, produced about the same amount as last year. The summer limit was reached on July 4th, while the winter limit was not reached at the close of the winter season, being some 100 cwts. short.

Turtle Lake on which there is both a summer and a winter limit, neither of which were reached, is no doubt declining and is largely due to the great amount of net fishing carried on under Indian and Halfbreed Permits, of which there were 76 issued during the year. An effort should be made to replenish this lake the coming season, and to close the spawning grounds from all net fishing as recommended.

Lakes such as Red Deer, Little Trout and Crean have fallen off, more or less, during the year. Montreal Lake, which was fished during December, for the first time in years, was a failure. This was largely due to the fact that while this lake is large, it is very shallow and whitefish do not inhabit it during the winter season.

Jackfish Lake shows an increase in production with a slight decrease in the number of men operating.

In the Waterhen Lake District, Waterhen Lake itself shows a marked increase, while other smaller lakes such as Flotten Lake, have decreased considerably, due largely to the fact that fewer men operated.

#### LICENSES

There were 856 Commercial and Fishermen Licenses issued during the year. This is an increase of 62 over the previous year, due to some extent to the adverse crop conditions in the Province during the fall of the year.

#### EQUIPMENT

The total value of all equipment used during the year in connection with the Commercial Fisheries was \$95,694, an increase over the previous year of \$12,967. There is an increase shown of 774 gill-nets valued at \$9,474 due largely to the increase in fishermen and as well to the increased number of Commercial Fishery Licenses issued. There is also an increase of 25 hoop-nets valued at \$500, all on the Saskatchewan River. There is an increase of three smoke houses valued at \$3,750—reports show that eight new smoke houses were constructed on Peter Pond Lake, valued at \$4,400, while two on Makwa, two on Turtle and one on Okemasis Lakes were not used during the year. There is also an increase shown of four gasoline boats and an increase in value of \$300. One of these was on Des Isles Lake, one on Jackfish Lake, one on Dore Lake and one on Long Lake, while there was a decrease of one on Makwa Lake. There is a decrease of one pier, four icehouses, sixteen row boats and 49 lines.

#### DOMESTIC FISHING

There has been a total catch during the year under Domestic net fishing of 15,329 cwts. of fish. This is a decrease of 254 cwts. from the previous year. There has been an increase shown of 377 cwts. of whitefish and 522 cwts. of tullibee and a decrease of 5 cwts. of trout, 171 cwts. of pickerel, 598 cwts. of pike, 179 cwts. of mullets, 258 cwts. of mixed fish, 24 cwts. of goldeyes and 18 cwts. of sturgeon.

The average catch per fishermen was 1,611 pounds, as compared with 1,604 the previous year, and 1,571 during 1924.

There were 952 Domestic Licenses issued, a decrease of 8 from 1925.

### to submit with the report on ANGLING

There is an estimated total catch of fish by anglers during the year of 26,915 cwts. This is an increase over the previous year of 2,587 cwts. Of this increase pickerel shows 1,287 cwts., pike 875 cwts., perch 101 cwts., goldeyes 132 cwts., trout 5 cwts., and mixed fish 187 cwts. The principal increases in pickerel were in the districts of Wakaw and Long Lake; pike in Red Deer Lake and Wakaw Lake districts, Long Lake district, Devil's Lake district, and in the Qu'Appelle Lakes, perch in Jackfish and Long Lake districts, and goldeyes in the Saskatchewan Rivers.

The average catch per angler during the year was 60 pounds as compared with 62 pounds during the previous year and 63 pounds during 1924.

There has been a gradual restriction of the use of nets in all the smaller lakes as they become more accessible to the angler due to better roads being constructed to them.

There is an estimated number of anglers shown as 44,914. This is an increase of 5,232 over the previous year and is not confined to any particular district, but appears to be general throughout the province. The average angler, who at one time fished for all the fish he could catch, is gradually becoming a sportsman. This is seen in the better quality of rods, and better and lighter tackle being used.

During the year 286 special angling permits were issued to non-residents. This shows a decrease of 207 from the previous year, but is to be almost fully accounted for by the increase in the number of angling permits issued by the Forestry Branch, who have in many instances the same persons issuing their permits this year as this Department have had in the past few seasons.

### OBSERVANCE OF REGULATIONS

During the year there were 87 prosecutions and a conviction was secured in all cases, resulting in fines amounting to \$491 being imposed with additional court costs of \$308.55, as follows:—

Fishing during close season.....	47
Fishing without a license.....	14
Fishing with illegal apparatus.....	12
Illegal possession of fish.....	6
Fishing to excess.....	3
Offering fish for sale under domestic license.....	3
Obstructing streams.....	1
Failing to tag nets when in water.....	1
	<hr/> 87

There were also 56 confiscations made during the year, as follows:—

Illegal apparatus.....	18
Illegal caught fish.....	17
Legal apparatus.....	21

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There were 44 sales of confiscated articles made amounting to \$291.33.

### FISHWAYS AND DAMS

Minor repairs were carried out to the Cowan River dam and the matter of installing new fishways in the dams at Gravelbourg and Swift Current are under consideration. A number of dams in the Qu'Appelle valley were inspected by Mr. Bruce, Fisheries Engineer, during the year, with a view of installing more efficient fishways. A number of small dams in the Cypress Hills area,

where trout have been recently planted, were investigated and the matter of providing a passage of fish has been arranged with the owners, as well as the screening of some of the irrigation ditches.

#### EXAMINATION OF WATERS

During the year there were 39 waters inspected to determine their suitability for fish life.

### REPORT OF R. T. RODD, INSPECTOR OF FISHERIES, PROVINCE OF ALBERTA, FOR 1926

The year 1926 has been a record one in every way. Prices were exceptionally good and the production in most of the large lakes heavy. There has been a keen competition for fish from this province both from New York and Chicago and other eastern markets, and the local demand has also increased. Fish are being marketed in better condition and greater care has been taken in packing the fish to suit the market requirement. A very large increase in the number of anglers will be noticed from the issue of angling permits. Details of my report are as follows:—

#### INCREASES

Increases in weights . . . . .	1,105,600 pounds
Increases in value . . . . .	\$290,572

The limit was obtained for whitefish at Lesser Slave lake and lac la Biche, the former lake recording a large increase through the addition of Buffalo Bay lake, which joins Lesser Slave lake and which contains nothing but coarse fish. Both pike and pickerel were plentiful, the former being shipped filleted. Good prices were obtained. Increases may also be noted in lac Ste. Anne where a particularly good class of whitefish was obtained this year. This lake a few years ago was claimed to be depleted, and was only fished lightly. Good catches have been obtained, however, for the last two years from this lake; this being chiefly due to a large decrease in coarse fish from an adjoining lake—lake Isle, which has a connecting river to lac Ste. Anne. Particularly gratifying was the experiment conducted at lake Athabasca. Close to 350,000 pounds of fish, 50 per cent being trout and averaging four to five pounds each, were caught and marketed from this lake, the fish reaching the market in good condition. With this season's experience the company has decided to enlarge their operations next year, and are building several new ice houses. At the present time ice houses have been built at Fort McMurray and Fort Chipewyan. The company operating states that there is a very large body of fish to be found in this lake. Beaver lake, near lac la Biche, was also fished heavily, producing 75 per cent jumbo whitefish of a particularly good class and for which big prices were paid.

Winter fishing on the whole was only fair, with the exception of Winnifred lake which produced nearly 600,000 pounds of whitefish, and which is claimed by the overseer of the district to be the most productive piece of water in the province. As high as 175 fish were caught in one hundred yards of net. The fishing at Pigeon lake was good, but the fish are too small and difficulty is now arising in marketing fish from this lake. Cold and Primrose lakes were steady in production.

## DECREASES

The Peter Pond Lake District is under the administration of the Inspector for Alberta, but the statistics are included with those for the province of Saskatchewan as the lakes are located in that province.

The decrease to be noted in the Peter Pond group of lakes is chiefly owing to the fact that one of the companies operating at this lake discontinued operations. Further owing to the demand for fresh fish difficulty arose in marketing the frozen fish of the previous winter, and the companies operating at Peter Pond lake stopped fishing early. According to this winter's operations fishing has been quite as good as in former years, and it is not considered that these lakes are in any way depleted. Discontinuance of summer fishing at Cold Lake, owing to the amount of angling carried on, and poor fishing at lake Wabamun, Buck lake (Township 61), Trout and Peerless lakes, and lake Isle, were responsible for the chief decreases. The poor fishing was chiefly attributable to the scattering of the fish, and over fishing in former years, as well as the increase in water levels through the wet summer season of 1926. This was particularly so at lake Wabamun, where the water level was much higher than in former years, and it is thought that the fish have changed their feeding grounds in consequence. I look for a good season on lake Wabamun this summer.

## MARKETS

The keenest competition in years was evinced during the past year, buyers from the east having been stationed here most of the year. Good prices were obtained for all classes of fish, and I believe that markets are even being canvassed for the shipment of suckers. The average price for whitefish was around ten cents to the fishermen, the same price being obtained for pickerel and perch. Trout averaged eight cents and pike five to seven. The shipment of fresh fish in the winter season continues to increase. This winter, however, there was a distinct shortage of the frozen variety, the demand being good and prices good.

## TRANSPORTATION

Transportation facilities have been excellent, the Express Companies doing their utmost to get business, and no difficulty occurred in securing enough express cars. In fact the outlook from this source is the best in years. Trails and roads were cut into Isogun and Hash lakes, but the same have not proved a success so far. Enough snow and cold weather have made trails this winter excellent. In fact from Peter Pond lake the fish commenced to be shipped out in the first week of the season, which has never been the case before. The great improvement in the highways of the province, many roads being gravelled, has made it possible for motor transport to be used for the transportation of fish from a number of lakes to the railroad. This also makes it much more convenient for anglers, as it is now possible with this improvement to the highways for them to reach nearly all the fishing streams or lakes in the province by motor car, which partly explains the large increase in the sale of angling permits.

## EQUIPMENT

Still greater improvement in equipment, both in nets and ice houses, may be observed. Boxes have been more carefully packed, the catch standardized, and at lake Athabasca new large ice houses have been built together with one large scow capable of moving 20,000 pounds of fish. The United Fisher-

men of Faust are building a refrigerator plant at Faust which will handle filleted pike, etc. The present refrigerator plant owned by the Menzies Fish Company was operated to capacity and has proven a decided success. The fine thread being used by the Pigeon lake fishermen has proved a detriment to the lake and is chiefly the reason for the heavy production of small sized fish. Recommendations have been made with a view to remedying this. More cottages and motor boats are being built at Cold lake for the accommodation of anglers.

## OBSERVATION OF THE REGULATIONS

The number of prosecutions for the year 1926 numbered 99, and the confiscations numbered 64. In addition three other confiscations were procured in the Brazeau Forest Reserve not yet reported. An enormous increase is evident in the issue of licenses. To date the sale of licenses, angling permits, etc., is as follows:—

Commercial and fisherman's.....	1,520
Domestic licenses.....	156
Angling permits.....	5,664
Indian and half breed permits.....	902
Total.....	8,242

An increase over 1925 of over 1,600, and over 1924 of 2,800. It is apparent that revenue collected this year should pay the expenses of this office, this for the first time in the history of this province. Much valued assistance was given both in stocking lakes and in assisting in the observation of the Regulations by the undermentioned clubs:—

1. Northern Alberta Fish and Game Protective League.
2. Claresholm Fish and Game Association.
3. Coleman Rod and Gun Club.
4. Lethbridge Rod and Gun Club.
5. Calgary Angling Association.
6. McLeod Angling Association.
7. Pincher Creek Angling Association.
8. High River Angling Association.
9. Bellevue Fish and Game Protective League.

This office also received assistance from the fifty-eight honorary guardians. There were also employed in a temporary capacity six special fishery guardians. Details of prosecutions are as follow:—

- 29 fishing in close season contravening sections 21 and 33.
- 16 using illegal mesh contravening section 17.
- 15 fishing without permit contravening section 32 (a).
- 8 fishing without license contravening section 1.
- 7 having undersized fish contravening section 34.
- 6 using illegal apparatus contravening section 29.
- 6 fishing in closed waters contravening section 24 (c).
- 6 fishing with excess nets contravening section 7.
- 2 fishing in Lake Minnewanka contravening section 3 (Dominion Parks).
- 1 possession of fish in close season contravening section 29.
- 1 fishing with illegal apparatus (trap) contravening section 31.
- 2 fishing with gang of hooks contravening section 36.

Total 99

Of the above number 20 prosecutions were obtained by forest rangers and park wardens in the forest reserves and within the Rocky Mountains National park.

## IRRIGATION SYSTEMS

There has been very little loss or destruction of fish reported in the numerous systems throughout the province during the past season. The only report received being the loss of suckers and pike left stranded at the outlet of Chin

Lakes reservoir, on the Canadian Pacific Railway southern Alberta irrigation system. On the other hand the reservoirs have furnished excellent angling for pike.

#### DAMS AND FISHWAYS

A new fishway was installed in the Alberta and Great Waterways Railways dam in the Redwater creek at Opal. Permission has been granted Mr. A. P. Stoppe, of Cold Lake, Alberta, by the Water Power Branch of the Department of the Interior to erect a three-foot dam in Marie creek, near the outlet of Marie lake. A fishway will be installed in this dam. A dam and fishway is also being installed by the Canadian Pacific Railway in the Vermilion river near Hazeldine, Alta. All other dams and fishways previously installed were kept in good repair during the season.

#### EXAMINATION OF LAKES AND STREAMS

During the season twenty-six lakes were examined with a view to stocking and seven barren lakes were found suitable. While four were found sufficiently well stocked with suitable fish the balance were found to be unsuitable for stocking for various reasons. Adult perch were transferred to three lakes from lac la Nonne. During the early spring a number of bass were procured by the Northern Alberta Fish and Game League and liberated in lac la Nonne. Owing to continued bad weather and the poor condition of the roads this work could not be extended.

#### ANGLING

There has been a large increase in the number of anglers at Cold lake last season over that of the previous year. The total amount of fish taken at Cold lake on 643 angling permits issued was 42,370 pounds of trout, 120 pounds of pickerel, and 1,200 pounds of jackfish. The largest specimens taken were: trout, 35 pounds; pickerel, 16 pounds; pike, 24 pounds.

This lake is becoming well known throughout the Prairie Provinces, as well as the Western States, and will eventually become a noted fishing resort.

Angling for rainbow trout and Rocky Mountain whitefish is gradually improving in the tributaries of the Athabasca and McLeod rivers, in the Edson district. Several reports of large catches were received. Excellent angling was also reported throughout the southern part of the province. This was exceptionally so in the Highwood river. Numerous anglers have informed me that fishing in this stream was never known to be as good as it was during the last season. One angler took from one pool in one day's fishing five cutthroat trout of a total weight of twenty pounds. Good catches of rainbow trout, weighing from one to one and one-half pounds, are now being taken in this stream.

Angling for pike, pickerel and perch was also good in the numerous lakes throughout the province.

The several lakes formed by the various irrigation systems have added greatly to the pike fishing in districts where scarcely any fish could be obtained before. Since the dam and screens were installed in the outlet of Sylvan lake some three years ago to prevent the pike from escaping at spawning time, the fishing in this lake has also improved greatly. The pike found in this lake are of an exceptionally fine quality and flavour. Good angling for Arctic grayling can be obtained in the numerous streams flowing into Lesser Slave lake. A government highway is under construction from Athabasca to the Peace river, which will make this fishing accessible to motorists in the near future.

## REPORT OF CHIEF INSPECTOR MAJOR J. A. MOTHERWELL, WESTERN FISHERIES DIVISION (BRITISH COLUMBIA) FOR 1926

## SALMON

The pack for the year totalled 2,065,185 cases of all varieties which is a record one for British Columbia. The average pack during the past five years was 1,633,063. The quantity of salmon taken during recent years has increased very largely, not due to there being a larger supply available, but owing to the favourable market conditions for the fall varieties, which has resulted in extremely intensive fishing. It is only within recent years that the pinks and chums have been in strong demand and the increase in the quantities of these varieties packed has caused the large totals.

The sockeye, which is the most valuable species, shows a pack of 336,995 cases, which is fairly well up to the average although some sections were not as productive as was anticipated.

On the Naas river the total was only 15,929 cases and only a limited quantity reached the spawning areas.

In the Skeena River district the total was 82,357 cases which was fairly satisfactory in view of the runs occurring in the brood years, the pack in 1921 being the smallest on record for the Skeena area although 1922 showed a total of 100,615 cases. The Skeena run is composed chiefly of four and five year fish.

The pack of sockeye actually caught in the rivers and Smiths Inlet district amounted to 89,866 cases and in view of the quantities captured in the brood years of 1921 and 1922, the 1926 total was not at all unsatisfactory and the spawning grounds were found to be well seeded.

The quantity taken in the Fraser river was unusually large in view of the experience since 1917. The average pack during the years 1921 to 1925 was 36,358. That of 1926 totalled 83,589 cases.

Usually the fishermen on Puget Sound on the American side take approximately 75 per cent of the sockeye running to the Fraser river. This year, however, the Puget Sound total was only 44,673 cases. Taking the total pack on the Fraser river and that on Puget Sound, the quantity is 128,262 cases and considered in that way is not encouraging. The unusually large pack put up on the Fraser was due entirely to a late run which arrived during the last of September and the first of October and only a very small fraction of which was taken on the American side. Had the usual proportion been captured in Puget Sound the pack on the Fraser would have been a different story.

It has been suggested that this late run approached the Fraser river from the north by way of Seymour Narrows which would account for the small percentage entering the traps to the south of the International boundary. This is a point, however, on which there is no unassailable evidence.

In the case of the cohoes the total taken in 1926 was a fair average for recent years.

The pink pack amounted to 772,992 cases. The largest previous pack was in the year 1924 when it amounted to 657,561 cases. A large factor in this total was the catch on the Queen Charlotte Islands where the run in the even years is very large particularly in the Masset Inlet district, the quantity taken at that inlet totalling close to 200,000 cases.

The pack of chums totalled 701,971 cases which far exceeds the catch of the next largest year which was 1925 with a total of 607,904 cases.

With the greatly increased quantity of fishing equipment in the water and particularly purse-seines, the time would seem to have arrived when the Department must go to considerable lengths with a view to the conservation of the salmon. One of the great difficulties is in properly protecting the mouths of

streams. If the numerous small seines which have operated during the past two years and which are increasing each season can be eliminated it will be of very material assistance but it would seem to be necessary to go even farther and it may be found imperative in the very near future to also prohibit all drag-seine operations. With the development of more efficacious fishing methods it is now possible to take the salmon considerable distances out from the streams to which they are heading for spawning purposes and the tendency in the administration of the regulations should be in the future to continue the extension of the boundaries in order to confine the seining operations to areas quite distant from the spawning streams and where in addition a better class of fish would be taken. The gill-net operations which are confined largely to the sockeye fishing can be very readily controlled and we have every justification to feel that conservation of the sockeye will be properly looked after.

#### HALIBUT

There were 315,095 cwts. of halibut landed in British Columbia during the year. This shows a decrease of 3,145 cwts. from the previous season and is the smallest total since 1922. It is interesting to note that the reduction was altogether in the quantity landed by American vessels, the quantity landed from Canadian bottoms showing a slight increase. On the whole the fishermen had a successful season as the prices during the year were good. The Canadian fishermen, however, still feel the handicap of the 2-cent tariff in favour of the Americans and this is the cause of considerable dissatisfaction.

Another source of friction during the past few seasons is the lack of observance on the part of the foreigners of the boundary between British Columbia and Alaskan waters. While the boundary shown on the charts is enforced by the American patrol boats, Alaskan fishermen are permitted to come south of this line and compete with Canadian boats in what the Canadians feel are their own waters. It is hoped that in fairness to Canadian operators this boundary question will speedily be settled.

#### HERRING

The annual report covers the calendar year whereas the herring season runs through the fall of one year well into the spring of the following one. In this way the report necessarily deals with a portion of each of two runs.

The dry salt pack amounted to 938,647 cwts. which is the second largest on record but 144,527 cwts. smaller than the preceding season. This reduction is partly accounted for no doubt by the existing conditions in China, which is the market for the dry salted product. Weather conditions also have a very considerable effect on the herring catch and the pack is not always a good criterion of the quantity available.

Employees in the dry salting establishments are now all whites or Indians apart from two executives in each of the few Oriental plants which are left. The seining operations are also conducted principally by whites or Indians although 50 per cent of the crews operating on the east coast of Vancouver island may still be Orientals. In this connection it is interesting to note that now that the owners of herring dry salteries have realized that they must employ others than Orientals they are taking the necessary action in the way of providing better quarters and accommodation generally for the whites and Indians.

#### WHALING

Two whaling stations only operated during the year, these being the Rose Harbour and the Naden Harbour stations, both situated on the Queen Charlotte

islands. The total of 269, as per the following statement, shows a considerable falling off from recent seasons:—

	Sperm	Sulphur	Fin	Hump	Sei	Right	Total
Rose Harbour.....	64	11	91	21	24		211
Naden Harbour.....	16	3	33	4	1	1	58
Total.....	80	14	124	25	25	1	269

#### FUR SEAL SKINS

As a result of the privileges extended to the Indians of the province under the Pelagic Sealing Treaty, 2,824 fur seals skins were taken as follows:—

Vicinity of Queen Charlotte islands.....	239
Vicinity of Bonila island.....	416
Clayoquot Sound district.....	633
Barclay Sound district.....	1,536
Total.....	2,824

In the seasons 1925 and 1924 the totals were 4,465 and 2,232 respectively. No doubt the bad weather during 1926 and the smaller demand for fur seal skins had considerable to do with the decreased number taken. The average price for the season under review was \$8 per skin to the hunter.

#### DESTRUCTION OF SEA LIONS

Sea lion hunting operations were conducted under considerably more favourable weather conditions. The crew of the C.G.S. *Givenchy* supplemented by an expert machine gunner, accounted for 711 pups and 1,245 adults, a total of 1,956, as against 2,827 during the season 1925. The first landings were made on both the Pearl and Virgin rocks on June 9 and the final raid on June 19. The smaller quantity of these mammals found on the rookeries during the expedition would appear to show the result of the previous years' hunts. The adults were not so numerous and the killing of the large number of pups in the preceding year was evidenced by the lack of yearlings in 1926. It is, however, a fact that there were a considerable number of two-year-olds but these may have come from other colonies.

There was again much evidence of the satisfaction of those interested in the actual fishing operations. Undoubtedly the number of lions in the Rivers Inlet district during the fishing season has been considerably reduced.

As an evidence of the hazardous nature of these hunting operations which are carried on on the bare low rocks exposed to the full sweep of the Pacific, I would mention that a member of one of the landing parties on the Virgin Rocks was swept off the rock by a big wave but very fortunately was able to scramble back again. He was again washed off, however, before he could be taken aboard the launch.

With a view to the utilization of the hides, samples were brought back by the hunters and were handed to a local tannery. Nothing, however, came of this effort.

#### PATROL SERVICE

The service requires more permanent officers in the way of Overseers who, owing to their permanency, would undoubtedly take considerably more interest in their duties. Some of the sub-districts at present are so large and the operations conducted therein so intensive as to make it impossible for the

present permanent staff to give them the necessary close attention. Unfortunately the salaries paid to Overseers is, particularly in the north, so inadequate as to be unattractive to most good men. Much better pay can usually be obtained in other occupations. The efforts looking to conservation must keep pace with the increased intensive fishing and unless employment in the fisheries service is made sufficiently attractive from a standpoint of salary and unless the administration in British Columbia can be provided with the necessary facilities in the way of air service and efficient patrol boats, it is going to be impossible to conserve the sea products.

Unfortunately seaplanes were not available to assist in the protection of the fisheries during the year and this handicap was very keenly felt. While 91 power boats and 18 rowboats were employed together with 16 Overseers, 80 patrolmen and 28 guardians, undoubtedly the fisheries did not receive sufficient protection. If the desired results could be obtained by merely employing more boats and more men such an arrangement could be made but it is felt that particularly owing to the class of boats and men which are available any considerable increase would be a waste of money. There are large isolated districts without any means of communication or obtaining supplies but where salmon are plentiful. In these areas it would be utterly useless to attempt to take care of the situation by means of boats and guardians. The only adequate protection is by means of seaplanes both from the standpoint of results and also of economy. It is felt that unless this arm of the Service can be made available for future seasons it will be absolutely imperative to so restrict the operations of the fishermen as to seriously affect the cost of production.

The *Malaspina* in the course of the year logged 17,127 miles and the *Givenchy* 13,906. Fifteen of the smaller boats each logged over 5,000 miles.

The *Givenchy* was again used for several weeks for life-saving duties at a time when she should be undergoing annual overhaul in order to be available for the patrol of the halibut fisheries before the expiration of the closed period.

#### REGULATIONS

Owing to the anticipated intensive fishing in the sockeye gill-net areas in the north, those interested were, well in advance of the fishing season, informed if the number of salmon gill-net licenses issued for the several areas reached a figure at which the weekly closed period of 48 hours was felt to be inadequate, such close season would be increased. A definite number of licenses was decided upon as the dividing line in each district and this information was placed in the hands of those interested early in order that they would know definitely what to expect. Only in the Dean Channel, Fitzhugh Sound, Rivers Inlet, and Smiths Inlet areas was it found necessary to increase the weekly closed time and in each case nine additional hours were added.

One great menace to the salmon fisheries of the province, particularly the fall varieties, is the huge increase in the number of salmon purse-seines operating. This has increased from 92 in 1912 to 445, including transfers, in 1926. Previous to the year 1923 it was not possible to transfer a license from one of the 21 purse-seine areas to another but it was necessary to pay another license fee. In 1922 this amounted to \$300 in the case of salmon purse-seines plus  $\frac{1}{2}$  cent per fish caught. In 1923 the license fee was reduced to \$20 and licensees were permitted to transfer from one district to another without cost. In 1922 the number of salmon purse-seine licenses issued was 143. The following year with the license fees reduced, the number increased to 223 although with the privilege of transferring from one district to another. Conditions would be sufficiently bad were the nets all of large size but during recent

years, the last two particularly, fishing with small seines from 60 to 80 fathoms in length and from 3 fathoms in depth has developed, which places in the hands of anyone so inclined an instrument which can be used very readily in prohibited areas and in fact is only a temptation to fish where no operations are or should be permitted, inside the boundaries and inside the creeks where the fish are schooled up waiting for the proper water conditions before ascending to their spawning grounds. These nets are carried on boats as small as 30 feet in length. With this sized craft it is a simple matter to operate in shallow waters.

It will be observed that this year's salmon pack is the largest in the history of the industry but the increase is in those varieties of salmon which are taken by means of purse-seines. There is a point beyond which no run of salmon can be fished if any regard is to be had for the future supply. While no authority is yet in a position to determine just where the dividing line lies, at the same time we must be on the safe side and even possibly at the expense of considerably curtailing the pack, safeguard the supply.

It has been contended that the limiting of the size of purse-seines would eliminate the small man and take from him his means of making a living. The obvious reply to this argument is that unless the intensive fishing done in the manner employed by many of these small seines is not made impossible it will only be a short time before there will not be a sufficient quantity of salmon to support even the small man and the elimination of the small purse-seine is undoubtedly in the interests of every fisherman.

#### POWER BOATS IN SALMON GILL-NET FISHING, DISTRICT NO. 2

During the year 1926, out of a total of 3,423 salmon gill-nets fished in District No. 2, six hundred and thirty were with the use of power boats. It will be remembered that this equipment was not permitted up to and including the year of 1922.

#### CLEARING OF OBSTRUCTIONS IN SALMON STREAMS

While no work of a very extensive nature was undertaken during the year in the way of clearing of obstructions, the usual examination of the streams was made and many small obstacles removed and the spawning grounds and their approaches considerably improved. In the immediate future, however, considerable expenditure is contemplated in the very necessary work of building a fishway at Stamp River falls, improving the present one in the Fraser River at Bridge River canyon, and also in connection with the investigation of conditions at Hells Gate. The detailed report of the Resident Engineer will be found in another place.

#### UNNATURALIZED WHITE RESIDENT FISHERMEN

The regulations require that no one shall receive a fishing license unless he is a British subject with the exception that bona fide settlers to whom special consideration is given. It was found that many desirable white men from European countries with fishing experience, were migrating to this country and were desirous of taking up fishing for a living. On satisfactory evidence being produced to the effect that these men would become British subjects as soon as by law this would be permitted, they were given fishing licenses. The number of men to whom licenses were so issued was 414. These fishermen were largely employed to fill the vacancies created by the reduction in Orientals. As a rule they were found to be very satisfactory and many of them have themselves invested in boats and nets. Great care is taken, however, to see that this privilege is not abused particularly from a standpoint of the migrant who ultimately intends to reside in another country but who, owing to the

quota being full, remains in Canada for a few months only and desires to take up fishing until the quota is reopened. Also licenses are refused to subjects from another country who may wish to fish during the summer time in British Columbia waters but with the intention of returning to their own country each season immediately after the fishing operations are over.

#### MEETING OF OVERSEERS

The annual meeting of the Inspectors and Overseers was held in March at the office of the Chief Inspector. Undoubtedly the opportunity of meeting and discussing the numerous problems in connection with the administration of the Fisheries is of immense value and is so demonstrated more and more each year.

#### FISH MEAL AND OIL OPERATIONS

There were 23 licenses issued for reduction works plants during the season. All but two of these were for establishments on Vancouver Island and all but four were issued for plants on the west coast of the island. Fourteen of these actually operated. This large increase in the last two seasons was due to the permission to utilize pilchards. These fish run in very large quantities on the west coast although their movements are very irregular which adds something of a speculative nature to the character of the operations of these plants. Pilchards cannot be utilized for dry salting as is the case with herring and the market for the canned product is up to the present at least very limited, whereas on the other hand the demand for fish oil and meal has been found attractive.

In the past the seiners have waited for the pilchards to come into the several sounds where they were fairly easily taken when found. An attempt was made, however, in 1926, to, by the use of larger and better equipment, seine these fish on the outside in the exposed waters of the Pacific. The results, however, were not encouraging as although the fish can be found in large quantities there is great difficulty in seining due to weather conditions.

Herring had not been permitted to be used in British Columbia for the purposes of the manufacture of fish meal and oil until January 15, 1925, when this permission was extended to Districts 1 and 2. This omitted Vancouver Island where the bulk of the herring in the past have been caught. No one in Districts 1 or 2 has yet taken advantage of the opportunity to put the herring through their meal and oil plants but on the west coast of Vancouver Island permission was last fall given to those operating between Clayoquot Sound and the north end of Vancouver Island to, until the end of the calendar year, use herring. Only 2,000 tons were used and apparently the operators found little encouragement to continue at that time, claiming that the bulk of the herring were available in the first two months of the year and that it was only at that time that their operations could be profitable.

The total quantity of fish oil and meal produced in the Province during the year was 9,694 tons of meal and 2,129,571 gallons of oil, that from pilchards only being 7,948 tons of meal and 1,898,721 standard gallons of oil. Most of the oil has been shipped to the United States or direct to the Old Country but the meal has been largely marketed in Japan.

#### GENERAL

One interesting development during the past few seasons is the increase in the employment of white labour in the salmon canneries. This applies principally to the employment of white girls who are replacing more and more each season the Indians and Orientals at the filling tables. Another feature of interest is the increased attention which is being paid by the canneries to cleanliness and sanitary conditions generally.



1905	67	"	"	1,030,673	28,359 (Red & Wh. Springs)	44,458	13,970	1,167,460
1906	68	"	"	439,679	31,261	69,132	68,305 (Pks. & Ch.)	629,460
1907	54	"	"	314,074	23,159	87,900	118,704 (Pks. & Ch.)	547,459
1908	52	"	"	355,023	25,433	81,917	76,448 (Pks. & Ch.)	542,689
1909	72	"	"	840,441	18,218	61,918	46,544 (Pks. & Ch.)	957,920
1910	58	"	"	565,915	19,313	74,382	34,613	762,201
1911	59	"	"	383,509	38,751	119,802	305,247	948,961
1912	57	3,640	92	444,762	62,345	165,309	247,743	996,576
1913	78	4,782	74	972,178	37,433	69,822	192,887	1,353,901
1914	63	4,857	61	536,696	32,908	120,201	220,340	1,111,039
1915	63	4,951	101	476,042	51,734	146,956	367,352	1,133,381
1916	72	4,600	80	214,789	51,231	183,623	280,644	995,065
1917	94	5,286	99	339,848	48,630	157,589	496,759	1,557,485
1918	88	5,073	122	276,459	65,535	191,068	527,745	1,616,157
1919	82	4,598	139	369,445	73,179	175,670	346,639	1,393,156
1920	65	4,761	155	351,405	95,983	101,972	520,856	1,187,616
1921	56	4,777	50	163,914	36,725	7,060	192,906	603,548
1922	64	4,491	143	299,614	21,163	1,657	581,979	1,290,326
1923	61	3,957	223	334,647	17,539	1,760	440,932	1,341,677
1924	62	3,696	242	369,601	18,741	4,267	657,561	1,747,505
1925	65	4,225	329	392,643	39,142	10,675	445,400	1,720,622
1926	76	4,750	445	336,985	41,232	19,445	772,992	2,065,188

NOTE.—Licenses issued 1923, 1924, 1925 and 1926 include transfers from one district to another.

## PACK OF CANNED SALMON ON THE NAAS RIVER—1876 TO 1926

STATEMENT No. 2

Year	Num- ber of can- neries oper- ated	Number of salmon licenses issued				Sockeye	Red Spring	Pink Spring	White Spring	Blue- backs	Steel- heads	Cohoos	Pinks	Chums	Totals
		G.N.	Troll	P.S.	D.S.	T.N.									
1876															
1877															
1878															
1879															
1880															
1881	1						Particulars of varieties not available—practically all sockeye.								7,700
1882	2						"	"	"	"	"				16,100
1883	2						"	"	"	"	"				20,383
1884	1						"	"	"	"	"				8,500
1885															
1886															
1887															
1888	1						Particulars of varieties not available—practically all sockeye.								12,318
1889	3						"	"	"	"	"				19,410
1890	3						"	"	"	"	"				23,906
1891	3						"	"	"	"	"				10,323
1892	3						"	"	"	"	"				25,434
1893	3						"	"	"	"	"				15,190
1894	1						"	"	"	"	"				19,587
1895	1						"	"	"	"	"				19,550
1896	1						"	"	"	"	"				14,649
1897	1						"	"	"	"	"				20,847
1898	1						"	"	"	"	"				18,953
1899	1						"	"	"	"	"				19,443
1900	1						"	"	"	"	"				18,238
1901	1						"	"	"	"	"				14,790
1902	2						20,953 (Other varieties: 2,365)								23,318
1903	1						Particulars of varieties not available—practically all sockeye.								12,100
1904	2						15,000 2,357 (Red and Wh. Spr.)					1,697	31		19,085

1905.	3	24,462	3,340 (Red and Wh. Spr.)	.....	3,085	1,840.	32,725
1906.	3	22,166	858	63	5,997	3,450 (Pk. and Ch.)	32,534
1907.	3	17,813	1,288	.....	6,093	5,957 (Pk. and Ch.)	31,832
1908.	3	27,584	3,263	.....	8,348	6,612 (Pk. and Ch.)	46,908
1909.	3	28,246	2,280	.....	6,818	3,589 (Pk. and Ch.)	40,990
1910.	4	30,810	1,228	.....	6,285	895	39,720
1911.	3	37,327	3,434	.....	7,842	11,467	65,684
1912.	3	36,037	5,710	.....	12,468	12,476	71,102
1913.	3	23,574	2,999	.....	3,172	20,539	53,423
1914.	4	31,327	2,660	.....	9,276	25,333	94,890
1915.	4	39,849	3,053	.....	15,171	34,879	104,289
1916.	4	31,411	3,061	.....	19,139	59,593	126,686
1917.	4	22,188	3,170	.....	22,180	44,568	119,495
1918.	6	21,816	2,332	.....	17,060	59,206	143,908
1919.	5	28,259	2,408	.....	10,800	29,949	97,512
1920.	5	16,740	3,584	.....	3,700	43,151	81,153
1921.	5	9,364	1,431	.....	8,236	29,488	51,765
1922.	5	31,277	1,466	.....	3,533	75,687	124,071
1923.	5	17,821	2,522	.....	7,894	44,165	99,580
1924.	4	33,590	2,142	.....	6,362	72,496	142,939
*1925.	3	20,351	5,441	.....	8,188	35,880	94,752
†1925.	.....	18,945	4,067	.....	7,726	34,530	89,008
*1926.	4	15,929	4,616	.....	4,274	43,891	85,825
†1926.	4	15,929	4,616	.....	4,274	50,815	92,749

NOTE.—Licenses issued 1926 include transfers from other districts.

NOTE re 1925 and 1926 figures:—\*Pack of fish caught at Naas River regardless where canned. †Pack at Naas River regardless where caught.

## PACK OF CANNED SALMON ON THE SKEENA RIVER—1876 TO 1926

Year	Num- ber of can- neries oper- ated	Number of salmon licenses issued				Sockeye	Red Spring	Pink Spring	White Spring	Blue- backs	Steel- heads	Cohoos	Pinks	Chums	Total
		G.N. Troll.	P.S.	D.S.	T.N.										
1876.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,000
1877.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,500
1878.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10,603
1879.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,694
1880.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
1881.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21,560
1882.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24,522
1883.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31,157
1884.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	53,986
1885.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12,900
1886.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	37,587
1887.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	58,592
1888.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	70,106
1889.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	58,165
1890.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	90,509
1891.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	78,135
1892.....	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	90,280
1893.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	59,675
1894.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	61,151
1895.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	67,797
1896.....	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100,140
1897.....	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	65,905
1898.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	81,234
1899.....	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	108,026
1900.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	128,529
1901.....	11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	126,092
1902.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	154,875
1903.....	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	98,669
1904.....	11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	154,869
1905.....	12	.....	.....	.....	.....	93,404	20,621 (Red & Wh. Spr.)	.....	.....	.....	.....	.....	30,529	.....	114,085
1906.....	14	.....	.....	.....	.....	84,717	14,598 (Red & Wh. Spr.)	.....	.....	.....	.....	.....	7,523	.....	162,420
1907.....	13	.....	.....	.....	.....	86,394	20,138	.....	.....	.....	.....	.....	.....	.....	*159,255
1908.....	13	.....	.....	.....	.....	108,413	10,378	.....	.....	.....	.....	.....	.....	.....	25,217 (Pk. & Ch.)
		.....	.....	.....	.....	139,846	13,374	.....	.....	.....	.....	.....	.....	.....	45,404 (Pk. & Ch.)
		.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10,075

Particulars of varieties not available—practically all sockeye.

7,523  
38,991 (Pk. & Ch.)  
25,217 (Pk. & Ch.)  
45,404 (Pk. & Ch.)

7,523  
16,867  
15,247  
10,075

93,404  
84,717  
86,394  
108,413  
139,846

20,621 (Red & Wh. Spr.)  
14,598 (Red & Wh. Spr.)  
20,138  
10,378  
13,374

10,315  
7,523  
16,867  
15,247  
10,075

30,529  
7,523  
16,867  
15,247  
10,075

114,085  
162,420  
\*159,255  
209,177

1909.....	12.....	87,901	11,727	742	12,249	28,120 (Pk. & Ch.)	140,739
1910.....	12.....	187,246	9,546	239	11,531	13,473	222,035
1911.....	12.....	131,086	15,514	2,428	23,376	81,956	254,410
1912.....	12.....	92,498	19,332	4,501	39,835	97,588	254,258
1913.....	13.....	52,927	23,250	3,186	18,647	66,045	164,055
1914.....	13.....	130,166	11,529	211	16,378	71,021	237,634
1915.....	13.....	116,553	15,069	204	32,190	107,578	279,161
1916.....	14.....	60,923	18,372	2,561	47,409	73,029	223,158
1917.....	15.....	65,760	13,586	2,699	38,456	148,319	202,219
1918.....	15.....	123,322	16,013	6,828	38,759	161,727	374,216
1919.....	14.....	184,945	19,661	2,656	36,559	117,303	398,877
1920.....	15.....	90,869	37,403	3,123	18,068	177,679	334,392
1921.....	13.....	40,018	18,599	445	45,033	124,457	234,765
1922.....	13.....	100,615	7,080	1,805	24,673	203,555	362,055
1923.....	13.....	131,731	8,863	1,499	31,967	145,973	338,863
1924.....	13.....	144,732	9,511	1,301	26,907	181,338	390,967
†1925.....	13.....	77,785	17,811	2,457	38,029	127,226	76,352
†1925.....	13.....	81,149	19,185	2,603	39,168	130,083	348,866
†1926.....	15.....	82,307	17,878	1,750	30,153	170,586	350,786
†1926.....	15.....	82,357	17,878	1,750	30,209	210,064	407,515

\*Approximately.

NOTE re 1925 and 1926 figures.—†Pack of fish caught at Skeena River regardless where canned. ‡Pack at Skeena River regardless where caught.

NOTE.—Licenses issued 1923-1924, 1925 and 1926 include transfers from other districts.



## FISHERIES BRANCH

Year	8	74,452	1,254	9,505	4,679 (Pk. & Ch.)	89,890
1908	8	102,527	1,087	1,400	300 (Pk. & Ch.)	105,314
1909	8	141,921	383	2,075	19	144,398
1910	8	105,763	1,317	8,287	6,411	127,066
1911	8	129,217	1,452	11,095	11,723	158,798
1912	8	79,345	1,589	3,708	4,287	90,944
1913	8	89,880	566	7,789	5,784	109,052
1914	7	162,651	1,022	7,115	2,964	292,179,431
1915	8	58,192	1,033	15,314	3,567	13,990
1916	9	75,326	715	12,074	8,065	113,758
1917	10	68,447	957	12,074	8,065	128,937
1918	10	66,842	967	12,074	8,065	10,736
1919	11	73,754	967	9,038	6,538	10,736
1920	10	72,072	967	9,038	6,538	10,736
1921	10	142,793	1,537	2,922	26,189	174,938
1922	10	135,246	1,537	2,922	26,189	166,590
1923	10	50,849	386	4,055	3,055	58,562
1924	10	49,799	406	4,784	5,356	60,569
1925	10	68,818	216	1,145	24,311	94,900
1926	10	66,678	216	1,145	24,311	92,690
1927	10	118,502	230	1,526	10,057	133,930
1928	10	112,350	230	1,526	10,057	127,778
1929	10	91,764	215	1,886	15,103	114,318
1930	10	201,186	344	4,887	7,675	226,030
1931	11	170,881	216	4,886	11,477	196,132
1932	12	89,866	535	10,348	8,493	124,341
1933	12	74,629	473	7,448	13,503	108,148

NOTE.—Figures shown in black are packs from fish caught at Rivers Inlet or Smiths Inlet. Figures in black for years previous to 1918 are actual packs. Figures shown in *italic*, 1918 to 1926, are actual packs irrespective of where fish taken and not including fish shipped out for canning in other districts.

\*1914 figures include Rivers Inlet pack only, no figures being available for Smiths Inlet for that year.

NOTE.—*Re* column "Varieties other than sockeye packed at Smiths Inlet." For the years this column is utilized, figures of the different varieties other than sockeye packed at Smiths Inlet were not available, and had to be shown as a total Sockeye for these years are shown under their proper heading.

NOTE.—Licenses issued 1923, 1924, 1925 and 1926 include transfers from other districts.



1905	38	2,770	837,489	5,507: (Red and White Spring)	30,836	3,304	877,136
1906	24	1,746	183,007	6,503	35,413	15,543 (Pk.&Ch.)	240,486
1907	18	1,726	59,815	3,448	35,766	63,530 (Pk.&Ch.)	163,116
1908	16	1,374	63,126	1,427	24,198	415 (Pk.&Ch.)	89,184
1909	38	2,688	542,248	1,428	21,540	1,987 (Pk.&Ch.)	567,203
1910	21	1,577	133,045	1,018	27,855	128	223,148
1911	15	1,396	58,487	7,028	39,740	142,101	301,844
1912	15	1,430	108,784	14,655	38,574	47,237	173,921
1913	35	2,560	684,596	3,573	11,648	12,961	732,059
1914	20	2,556	185,483	9,485	38,639	9,973	328,390
1915	22	2,616	89,040	15,388	34,114	6,057	289,119
1916	21	2,240	27,394	11,096	24,580	128,555	109,440
1917	29	2,026	123,614	10,197	25,895	840	377,988
1918	18	1,582	16,849	579	4,944	134,442	206,003
1919	14	1,337	29,628	14,519	3,760	18,388	158,718
1920	11	1,288	44,598	2,188	15,613	39,363	132,860
1921	13	1,437	35,900	467	4,488	12,839	103,917
1922	10	1,296	48,744	2,433	1,323	8,178	137,482
1923	11	964	29,423	3,615	812	29,578	224,637
1924	9	969	36,200	592	1,757	63,645	209,050
1925	10	969	31,523	873	25,482	31,968	272,993
1926	10	1,063	83,589	1,099	5,107	99,800	273,129
					14,036	32,256	

NOTE.—Licenses issued 1923, 1924, 1925 and 1926 include transfers from other districts.

## MARINE AND FISHERIES

## STATEMENT No. 6

## PACK OF CANNED SALMON OF PUGET SOUND FROM 1887 TO 1926

Year	Number of canneries operated	Spring	Sockeye	Cohoe	Chum	Pink	Steel- head	Total
1887.....		Particulars of varieties not available.						22,000
1888.....	4	"	"	"	"			21,975
1889.....	2	240		7,480	1,145	2,890		11,674
1890.....	1	1,000		3,000	4,000			8,000
1891.....	2	382	5,538	5,869	3,093	5,647		20,529
1892.....	2	86	2,954	7,206	16,180			26,426
1893.....	3	1,200	47,852	11,812	11,380	17,530		89,331
1894.....	3		41,781	22,418	22,152	9,049		95,400
1895.....	7	1,542	65,143	50,865	38,785	23,633		179,968
1896.....	11	13,495	72,979	82,640	26,550			195,664
1897.....	12	9,500	312,048	91,900	23,310	57,268		494,026
1898.....	18	11,200	252,000	98,600	38,400			400,200
1899.....	19	24,364	499,646	101,387	31,481	252,733		919,611
1900.....	19	22,350	229,800	128,200	89,100			469,450
1901.....		Particulars of varieties not available.						1,380,590
1902.....	21	30,049	372,301	85,817	93,492			581,659
1903.....	22	14,500	167,211	103,450	12,001	181,236		478,488
1904.....	13	14,441	109,264	118,127	49,656			291,488
1905.....	24	1,804	825,453	79,335	41,057	70,992		1,018,641
1906.....	16	8,139	178,748	94,497	149,218			430,602
1907.....	14	1,814	93,122	119,372	50,249	433,423		698,080
1908.....	22	95,210	170,951	128,922	47,607	6,075		448,765
1909.....	11	13,019	1,097,904	143,133	53,688	370,993		1,632,949
1910.....	24	10,064	248,014	162,755	146,942	108		567,883
1911.....	15	21,823	127,761	256,124	104,321	1,046,992		1,557,029
1912.....	20	20,252	184,680	149,727	60,760	700		416,125
1913.....	22	1,234	1,673,099	61,019	56,225	791,886		2,583,463
1914.....	31	26,044	335,230	151,893	278,801	892		792,860
1915.....	41	28,466	64,548	180,783	411,724	583,649		1,269,206
1916.....	32	37,030	84,637	155,832	427,878	1,887		707,278
1917.....	45	57,543	411,538	114,276	216,285	1,124,884		1,921,554
1918.....	32	63,366	50,723	235,860	267,538	6,605	106	624,198
1919.....	35	68,542	64,346	210,883	525,541	421,215	5,076	1,295,626
1920.....	11	25,846	62,654	24,502	48,849	4,669		166,520
1921.....	23	25,567	102,967	89,412	30,831	404,713		653,490
1922.....	16	20,615	48,566	111,711	65,552	2,225		248,729
1923.....	18	15,777	47,402	122,000	97,081	475,849	29	758,138
1924.....	12	19,968	69,369	87,879	134,360	5,945	128	317,649
1925.....	23	28,268	106,064	171,587	41,635	555,848	141	903,543
1926.....		27,763	44,569	120,846	112,411	2,125	63	307,778

## STATEMENT No. 7

## STATEMENT OF HALIBUT LANDINGS—BRITISH COLUMBIA, 1913 TO 1926

	Cwts.
1913.....	223,465
1914.....	214,444
1915.....	194,896
1916.....	123,062
1917.....	113,529
1918.....	186,229
1919.....	210,777
1920.....	238,770
1921.....	325,868
1922.....	293,184
1923.....	334,667
1924.....	331,382
1925.....	318,240
1926.....	315,095

## CONDITIONS ON SPAWNING GROUNDS

*Queen Charlotte Islands.*—In the Masset Inlet area there is a small run of sockeye in May and June which apparently maintains itself each year. This in the past has never been fished to any extent commercially. The fish are of good size. The Queen-Charlotte area is not an important one from the standpoint of sockeye. The season of 1926 brought the usual large run of pinks salmon to the Masset area. This occurs only in alternate years and the 1926 run was well up to expectations and although approximately 200,000 cases were packed, an ample supply of spawning fish reached the upper areas. Speaking generally the east coast of the Islands was fairly well seeded with pinks and chums although the former variety were rather late in arriving. On the west coast, however, the spawning grounds were not found to be in such satisfactory condition apart from those streams north of Rennel Sound.

*Naas River.*—The supply of sockeye on the spawning grounds was found to be considerably smaller than the preceding year and even when compared to the brood years the quantity was considered far from adequate. The supply of spring salmon, however, was a satisfactory one although the coho run was practically a failure from the standpoint of the seeding of the spawning grounds.

*Skeena River.*—The run of sockeye to the spawning grounds of Babine Lake, although not as large as some years, was found to be very encouraging and should be amply sufficient to provide a return equal to if not greater than the average. The inspecting officer mentioned particularly the number of runts found amongst the parent sockeye this year. While the appearance of these small fish is not an unusual occurrence, yet indications would seem to point to the fact that during the season 1926 the proportion was greater than usual.

At Lakelse Lake the run of sockeye was a most satisfactory one.

The inspection of the Eestahl River area showed adequate numbers of spawning fish.

Conditions at Shawatlans Creek were found unusually satisfactory and there is no doubt but that the closing of this stream for the sockeye cycle has been the means of restoring the run.

*Central Division.*—Taking this district as a whole the spawning conditions were found to be encouraging. There was some fear at the commencement of the season that owing to the conditions of the streams there would not be sufficient water to permit the fall varieties particularly to pass up but at the time the salmon arrived the rain also came and permitted the salmon to make the ascent easily. The Inspecting officer feels that the spawning grounds are better seeded this season than for four years at least. This applies to sockeye, pinks, chums, and cohoes.

*Bella Coola and Kimsquit.* The streams in the vicinity of Bella Coola have received a plentiful supply of sockeye, springs and pinks particularly and the spawning grounds of the Kimsquit area were found to be in a satisfactory condition with the exception of pinks, the sockeye and chum varieties being well up to the average. The conditions were considerably less satisfactory, however, along Burke and Dean Channels. These sections must receive closer attention in the future and it will probably be found necessary to close several of the streams entirely for a time.

*Rivers Inlet.* The pack of sockeye on the Inlet during the season has been a fair average and there was found to be an ample supply of spawning salmon of this variety in most of the streams emptying into Owekano lake. The Overseer, in his report, observes as follows:—

"I consider the Department justified in taking an optimistic view for the future of the industry on Rivers Inlet. The improved methods at

the hatchery, increased weekly closed times during the fishing season, early closing to allow the remaining salmon to enter the lake unmolested, is in my opinion solving the problem of conservation."

The Provincial Inspecting Officer in his report observes in part as follows:—

"I am of the opinion that the favourable conditions which were noted on all the tributaries, especially those at the head of the lake, showed clearly that a run of sockeye of greater proportion returned to the Inlet than was the case in 1921 and 1922. Not only did the packers put up a larger pack but the spawning beds showed a corresponding increase. Since the spawning beds in the brood years contained a run of only moderate proportions it must be assumed that in assisting the natural spawning by replenishing the rivers and creeks with millions of eggs from the hatchery added to which millions of young fry are turned loose into them each year, the Dominion Fisheries authorities have at last found a solution to the difficulty of ensuring an increase in the run of sockeye each year."

It will be remembered that owing to the large number of fishing boats licensed during the season it was necessary to increase the weekly closed period by nine hours. Undoubtedly the conditions at Rivers Inlet are satisfactory.

*Smiths Inlet.* Again this season there was an excellent showing of parent sockeye salmon on the spawning grounds although the pack was quite a large one. Here, as in Rivers Inlet, the fishing has become more intensive during recent years, which necessitates a shorter fishing season. In view, however, of the powers vested in the British Columbia administration there should be no difficulty in taking care of the situation.

*Alert Bay District.* The principal sockeye stream in this area is the Nimpkish river. The enforcement of the 72-hour weekly closed season has again permitted the necessary escapement of parent fish to the spawning areas. The beds were well seeded. In this connection it is interesting to note that the B.C. Fishing and Packing Company has reopened its hatchery on Nimpkish lake. The supply of springs was satisfactory although in view of it being an off year for coho there was not a large supply of this variety. An ample supply of chums ascended the river. The conditions at this point are particularly gratifying in view of the fact that 26 drag-seines operated in the river and 45 purse-seines fished along the shores on both sides of the river. Taking the district as a whole it is well stocked with salmon during the season. The run of pinks was very good.

*Quathiaski District.* The supply of sockeye was not as good as expected but there was an ample supply of pinks and chums and cohoes to take care of the spawning requirements.

*Comox District.* The varieties found in this area are pinks, chums, cohoes, and steelhead. Owing to the unusually heavy rains which came just at the right moment a plentiful supply of all these varieties succeeded in reaching the spawning grounds.

*Pender Harbour District.* This is also almost entirely frequented by fall salmon although a small run of sockeye ascends each year the Sauchen-Auch river. The catch at this point was very small, approximately only 3,000 fish, and it is estimated that between 18,000 and 19,000 passed through the fishway to the spawning grounds. Owing to 1926 being the off year for pinks the run was much lighter than the previous season although comparing favourably with the brood year. Owing to the timely arrival of the rains most of the pinks were able to reach the spawning grounds. The same thing applied very largely to the chums.

*Nanaimo District.* Here again the heavy rains resulted in the streams being in flood at the time of the arrival of the pinks, chums and cohoes, and the streams were well provided with spawning fish.

*Cowichan District.* The Cowichan river is the principal stream in this area. In October there was a splendid run of spring salmon. Previous to that time there had been excellent fishing in the vicinity of the mouth of the river, springs weighing from 40 to 60 pounds being taken by anglers and provided excellent sport. The spring run of steelhead trout was splendid and the spawning grounds should be well taken care of. The run of chums was not up to expectations but a very large percentage was able to reach the spawning grounds. The sport fishing in the district was very good.

*Alberni District.* The outstanding feature in this area was undoubtedly the large run of sockeye salmon to the Sproat and Stamp rivers. It is reported on good authority that years ago there was a fair run of this variety to these two streams but some seasons owing to the water conditions at Stamp Falls it has been impossible for the salmon to pass over on their way to Great Central lake. In addition there was for many years a dam across the river at the site of the old paper mill which prevented the ascent of the fish to the Sproat Lake spawning grounds. In 1915 a portion of the dam was removed which permitted the fish to ascend. During the seasons 1921-2-3-4-5 the boundary at the head of Alberni canal was placed sufficiently far out to prevent the fishing for these runs in order that they might be built up to their original condition of productivity. Also since 1921 an effort has been made by means of planting eyed sockeye eggs in the Sproat and Great Central areas to further assist in restoring the large quantities of sockeye. Whether it is due to one or other of these causes or that all contributed, the fact remains that during the season 1926 there was an unusually large run of sockeye to both the Sproat and the Stamp rivers, the run commencing about the 1st of May and lasting right through until approximately August 15. The water conditions at Stamp Falls prevented the fish from passing up but by means of dip nets and a crew of men 11,000 were passed safely over the obstruction. Unfortunately thousands died below the falls unspawned. It is the intention during 1927 to install a suitable fishway at this point which will permit all varieties of fish to easily ascend.

An unusual phase during the season was the appearance of a considerable number of pink salmon which ascended Sarita, Nahmint, Anderson and Toquart Rivers. As far as our records go there is no report of their ever having been any number of this variety in the Barclay Sound district.

The catch of chum salmon was very considerably less than that of the preceding season. The reason was not that there were not as many fish but was due to the fact that the rains came at the right moment and permitted a much smaller percentage of the run being taken by the fishermen. The streams were all well seeded with this variety.

The run of chums to the Nitinat district was approximately the same as 1925 and a good supply succeeded in reaching the spawning areas.

*Clayoquot Sound.*—The only sockeye streams in this area are the Kennedy River and the Medgin River. A very satisfactory catch of sockeye was taken principally in the vicinity of the Kennedy River. A good supply reached the spawning grounds in Kennedy Lake and the upper reaches of the Medgin River. The quantities of chums, pinks and cohoes were also found to be satisfactory in this area.

*Nootka District.*—Chums, springs, cohoes and pink salmon compose the run to this area. The quantity of cohoes and pinks was small. The fall run of spring salmon practically all is able to reach the spawning grounds. The

rains made it possible for a considerable portion of the chums to also pass up the streams and seeding generally of the area with this variety was satisfactory. This applies particularly to Camp Bay Stream, Deserted Creek, Conuma River, Marvins Bay Stream, Owas-Sit-sa River, and Garden Creek.

*Kyûquot District.*—The supply of chums and cohoes on the spawning grounds was found to be fair but the springs were few in number. On the whole the district is only fairly well seeded.

*Quatsino District.*—There is a small supply of creek sockeye in the district but the main quantity of salmon is of the fall variety, the largest proportion being chums. The area was some years ago quite intensively fished for the pink salmon but during recent seasons the operations have been small and it is hoped that the runs will shortly show the effects of the less intensive fishing, although there was a considerably increased quantity of gear in these waters during the season of 1926.

#### FRASER RIVER WATERSHED

The conditions found in the section above Hells Gate show improvement over past seasons in certain sections since the failure of the big four year run.

In the Stuart Lake District the sockeye salmon run was not as large as the previous year but with the exception of 1925 was the largest observed for a good many seasons. In Kynoch Creek, emptying into the Middle River, 250 spawning sockeye were counted where for years previous practically none had been seen. Fortunately the sockeye arrived some days before the Indians expected them and as a result they practically all succeeded in reaching their spawning grounds. While the observance of 250 spawning fish in one stream does not sound particularly encouraging at the same time compared to many seasons past it is most gratifying and would appear to show that some returns are being obtained from the fish cultural operations which have been conducted so intensively and by newer methods during the past five years in the district.

The run of spring salmon to the Stuart Lake district was unusually good.

Whitefish, in the Prince George district generally in the larger lakes, appear to be plentiful, some having been taken weighing as much as 10 pounds.

Particular attention was paid this year to the Francois Lake area. The evidence obtained would appear to show that years ago there was an excellent run of sockeye but practically none has been found for a number of seasons past according to the old Indians and Hudsons Bay employees who have been many years in the district. This year, however, quite a run of sockeye, comparatively speaking, passed up into the district and Indians are reported as having taken a number at the mouth of Uncha Creek in trout nets. These were in excellent condition.

In the Bowron River the fishery officer observed at least 600 sockeye on the spawning beds. While this is very small number considering the size of the area, at the same time in view of conditions found during the past few years it is highly encouraging. For the past three years practically no spawning sockeye have been found.

The run of sockeye to the Horsefly River, a tributary of Quesnel Lake, is reported as being the best for several years. At least 600 sockeye were seen in the river, which is encouraging in view of the fact that for the past four years, apart from an odd fish, there has been practically none of this variety noticed.

The reports received from the Chilcotin district are of no particular value in view of the lack of information with which the knowledge gained during 1926 can be compared. While the Indians took as many as 500 sockeye it is felt that the run was not as good as the preceding year for instance. The local fishery officer estimates the number as comparing favourably with the quantity arriving four years previously.

It is the conditions which were found on the Shuswap area which have given reason for encouragement. In 1922, 2,320,000 sockeye eggs were deposited by the Harrison Box method in Eagle River, a tributary to Shuswap Lake. This year although the river was fenced only two sockeye were taken. At Adams River, however, and Little River, two miles distant, an unusually large run of sockeye arrived in the early part of October. Four years previously it was estimated that between 20,000 and 25,000 sockeye parents spawned in Adams River. This season it is conservatively estimated that there were at least half a million spawning fish in Adams River between the canyon and the mouth, a distance of approximately seven miles, and in addition there were undoubtedly several hundred thousand spawned in Little River between Big and Little Shuswap Lakes. It is impossible to say whether this large return was the result of the planting of eyed eggs in the Eagle River four years previously or were the progeny of the 20 odd thousand spawning fish found in the brood year. When this unusually large quantity of sockeye was observed at the mouth of the Fraser they were found to be of inferior quality compared to the early run as the skin was discoloured, although apart from this feature the canned product was fair. The run was followed closely and it was found that all of it turned up the North Thompson River and proceeded to the Shuswap area. Unfortunately it was not possible to determine from what direction these fish approached the Fraser River. None was taken in the traps on Juan de Fuca Straits although several thousand were reported from the traps in the vicinity of Point Roberts. None was reported as having been taken at Deepwater Bay near Seymour Narrows but two weeks previous to these fish entering the Fraser River proper they were observed in English Bay just outside of Vancouver Harbour and the fishermen were obtaining good catches. Unfortunately there was no money available this year for carrying on the tagging operations. Had these been continued at Deepwater Bay and the traps in Juan de Fuca Straits it is felt that some interesting information might have been obtained.

It is interesting to note that although this late large run of salmon were observed by the fishery officers miles below Hells Gate on the way up the Fraser River, very few were seen at Hells Gate itself although all got through, which demonstrates that conditions at the Gate were quite satisfactory at the time these fish arrived. The local fishery guardian, Mr. T. E. Scott, in this connection observes as follows:—

“It is stated that more sockeye passed on to the spawning grounds than for many years. It is also to be recorded that less salmon were in view than any previous season at Hells Gate.”

Again this year in the Seton-Anderson Lake district quite a considerable number of spawning sockeye were observed, the number being, however, smaller than in 1925.

It is estimated that the number of salmon taken by the Indians of the Westminster, Lytton, Kamloops and Williams Lake Agencies was as follows:—

Sockeye.. . . .	5,600
Springs.. . . .	6,700
Cohoos.. . . .	4,500
Chums.. . . .	1,500

Mr. Scott observes with regard to his district that from the numbers seen during the season he is led to believe that the sturgeon are increasing rapidly.

The run of sockeye to the Birkenhead river has been well maintained. The Superintendent of the Pemberton Hatchery states that the run of 1926 was considerably larger than that of 1925 although it is difficult to compare it with four years previous owing to the fact that in 1922 the water was high through-

out all the season which brought the fish in with a rush and made the estimating of the quantity considerably more difficult. He feels, however, that the quantity very nearly, if not quite, equals that of 1922.

The Harrison Lake examination showed that Morris creek, the principal sockeye spawning grounds, contained more of this variety than had been observed for a number of years past. These were all permitted to spawn naturally as the hatchery was not in operation. The Indians report as having seen more of this variety of salmon passing up the Harrison River rapids than for a considerable number of seasons past. This also applies to the quantity of spring salmon.

There was an average supply of spawning sockeye to Cultus lake although owing to the operations of the Biological Board none was permitted to pass up into the lake and spawn naturally. All the eggs were taken and placed in the hatchery.

An examination of the Pitt Lake district also showed an excellent seeding of sockeye. Undoubtedly the supply at that point is at least being maintained. The Superintendent of the hatchery observes as follows:—

“I may say that the run of sockeye this year in comparison with former years was much bigger.”

At Indian river, at the head of Burrard inlet, and the streams at the head of Howe sound, the salmon runs which are all of the fall variety, were a fair average.

The season 1926 was that in which there were practically no pinks running to the Fraser river system. They run in alternate years only and then in considerable numbers.

Generally speaking conditions in the Fraser river were found to be fairly satisfactory.

## APPENDIX 2

## REPORT ON THE WORK OF THE BIOLOGICAL BOARD FOR 1926

By J. J. COWIE, *Secretary-Treasurer*

The board has charge of and controls the work at the scientific stations. It meets once a year or oftener at such times and places as are found necessary. A committee known as the Executive Committee supervises and carries out the undertakings involved in the policies formulated by the board. Sub-committees on the Atlantic and Pacific coasts have immediate supervision, under the central executive, of the activities of the boards.

## STAFF OF WORKERS AT THE RESPECTIVE STATIONS

## BIOLOGICAL STATION, AT ST. ANDREWS, N.B.

The station was opened for workers in residence on June 1, and closed September 15.

*Investigators*

The following is a list of the investigators who were at the station during the season, the subjects upon which they were engaged, and the duration of their stays:—

Miss Margaret G. Allan, Dalhousie University; June 3 to August 31; illustration of marine algæ.

Prof. B. P. Babkin, Dalhousie University; June 18 to August 20; physiology of the digestive tract in fishes.

Miss Helen I. Battle, University of Western Ontario; June 17 to September 3; upper lethal temperatures and temperature coefficient of death rate in elasmobranch tissues.

Mr. S. A. Beatty, Queen's University; June 9 to August 24; chemistry of fish muscle.

Dr. H. P. Bell, Dalhousie University; June 3 to September 3; succession of algal forms in tide pools.

Mr. A. F. Chaisson, University of St. Francis Xavier's College; June 5 to August 25; lethal effects of extreme salinities on tissues of fish.

Dr. C. J. Connolly, University of St. Francis Xavier's College; August 16 to August 21; copepoda parasitic on crustacea.

Miss C. Helen Crow, University of Toronto; July 15 to September 13; anatomy of the nervous system of the skate.

Miss Viola M. Davidson, High School of Commerce, Toronto; June 21 to August 18; causation of diatom maxima.

Mr. D. Cecil B. Duff, University of Toronto; June 4 to August 23; resistance of fish to certain pathogenic organisms.

Dr. A. H. Gee, University of Toronto; July 5 to September 6; spoiling organisms in haddock muscle.

Mr. F. R. Hayes, Dalhousie University; June 10 to July 13; salinity and temperature tolerance for fry of Atlantic salmon.

Mr. J. M. Harvey, University of Toronto; June 3 to August 16; the effect of high intensity of light on marine copepods.

Miss Jean T. Henderson, McGill University; July 13 to September 3; effect of temperature on the heart beat in schizopods.

Dr. A. G. Huntsman, June 18 to July 15, July 23 to July 31, August 15 to August 31, September 8 to September 20; post mortem changes in the flesh of fishes.

Mr. G. W. Jeffers, University of Toronto; May 13 to 25; September 8 to September 15; experiments with smelt eggs; hydrogen ion concentration in haddock flesh.

Dr. A. B. Klugh, Queen's University; June 4 to September 10; the measurement of light; survey of Chamcook lake.

Mr. L. W. Koch, Queen's University; June 4 to July 1; culture of Rotifera.

Dr. A. H. Leim, April 24 to May 20, May 31 to July 5, July 13 to July 31, August 16 to October 1; suitability of Quill lake water for development of carp eggs; effect of handling on rigor mortis of haddock.

Dr. J. J. R. Macleod, University of Toronto; June 22 to September 20; carbohydrate metabolism in fishes.

Miss Emma C. Odell, Macdonald College; June 21 to September 15; phototropism of various marine copepods.

Mrs. K. F. Pinhey, McGill University; June 26th to August 7; effect of temperature on the respiration of flounders.

Dr. G. B. Reed, Queen's University; July 15 to July 31; autolytic and bacteriological decomposition of fish.

Miss C. E. Rice, Queen's University; June 5 to August 21; autolytic and bacteriological decomposition in lobster.

Mr. S. J. Sanderson, Queen's University; June 8 to August 20; autolytic and bacteriological decomposition in haddock.

Mr. T. R. Sarjeant, University of Toronto; June 30 to September 6; rates of growth of internal organs of haddock in relation to growth of the body as a whole.

Mr. W. W. Simpson, University of Toronto; June 22 to August 28; carbohydrate metabolism of fishes.

Mr. E. E. Watson, McGill University; June 5 to August 20; salinity titrations; effect of damming Passamaquoddy bay.

Miss Nelda Wright, University of Western Ontario; June 26 to August 27; diatoms in the fish food cycle.

### *General Investigations*

Weekly and monthly collections of plankton and hydrographic material at a number of established stations in Passamaquoddy bay, St. Croix river, the Bay of Fundy, etc., were continued. Daily records of the temperature of air and water, which have been taken for several years at St. Andrews, were continued.

### *Field Investigations*

The *Edward E. Prince* spent the summer along the southwestern coast of Nova Scotia. In addition to obtaining hydrographic, planktonic and other material, an extensive fish tagging program was carried out. 8,333 fish were measured, scales taken and tagged. Of these 1,700 were mackerel, 3,714 cod, 2,749 haddock, 162 pollock, and 8 cusk. To date, December 31, the following numbers of tags have been returned: 6 mackerel, 239 cod, 16 haddock, and 1 pollock.

The study of the currents along this part of the coast by means of drift bottles was also continued. During the summer four lines were run from Cape Forchu bell buoy southwest a distance of 30 miles, at four-week intervals, and five lines from Brazil Rock over a course S.  $\frac{1}{2}$  E. a distance of 50 miles, at three-week intervals; 1,469 bottles in all were put out. The returns from these

bottles, which to December 31 number 279, will tend to show what differences there may be in the course of the currents on these parts of the coast at different times during the summer.

Mr. H. C. White continued his experiments on trout planting on Forbes brook, P.E.I., the particular experiment for this season being an attempt to analyze the factors concerned in the losses of brook trout fry subsequent to planting.

Mr. F. R. Hayes carried out an investigation to define the optimum conditions for the fry of the Atlantic salmon. This was done on Crowe's brook, a branch of the Northwest Miramichi river at Sevogle, N.B.

During the early part of the season Dr. A. H. Leim carried on experiments in the Magaguadavic river, near St. George, N.B., the object being to increase the number of smelt fry in that river, and to continue an investigation of the limiting factors for the smelt in the Passamaquoddy region.

Mr. D. A. McKay, of Ottawa, Ont., carried on an experiment in St. Mary bay, N.S., to determine the success of planting berried lobsters in the shallow waters of that bay. Mr. McKay also carried on a search in St. Mary bay for young lobsters of one, two and three years of age.

Mr. D. C. B. Duff visited the Middleton, N.S., hatchery and made an investigation of diseased fry there to determine the cause of the disease, which was suspected to be Octomitis. He also investigated the conditions in the waters near Yarmouth, N.S., in connection with the report of heavy infection of trout and salmon with tape worms. Also Mr. Duff, the director, and the assistant director examined into difficulties experienced with the salmon retaining pond at St. John, N.B., and the hatchery pond at Middleton, N.S.

At the request of the Department of Marine and Fisheries, Fish Culture Branch, Dr. A. H. Leim made an investigation of White Marsh stream, near Florenceville, N.B., to determine the suitability of the locality for the establishment of a hatchery.

Dr. Leim also continued his investigations of conditions in the lakes of New Brunswick; Chamcook, Wheatons, and Grand Lake, being studied.

Mr. G. W. Jeffers carried on an investigation of the capelin on the Gaspé coast at Barachois and Newport Centre.

Mr. A. W. H. Needler, of the University of Toronto, began an investigation of the haddock, using Lockeport, N.S., as a base for operations.

Mr. G. Lyman Duff, of the University of Toronto, continued his investigation of the cod, using the Fisheries Experimental Station at Halifax as a base for his work.

### *Educational Work*

From the 23rd to the 28th of August Dr. Leim conducted a course of instruction in collecting methods given at the station to seven of the hatchery officers and the district inspector of hatcheries of the Maritime Provinces.

### *Library*

During the season there were about 575 additions to the library. Some of the most important of these were: 44 volumes of the Zoological Record, making that set almost complete to date; practically a complete set of the Bulletins of the New York State Museum; Reports of the British Museum (Natural History) "Terra Nova" Expedition, 1910, Zoology, Vols. 1-8, and Botany, Vols. 1 and 2; and a complete set to date of International Revue der Gesamten Hydrobiologie u. Hydrographie.

### *Visitors*

Among the visitors at the station during the summer were the following: Mr. J. J. Cowie, Secretary-Treasurer of the Board; Messrs. Elmer Higgins and

O. E. Sette, of the United States Bureau of Fisheries; Mr. H. E. Tanner, of the Fisheries Experimental Station (Atlantic); Mr. James Catt, Inspector of Hatcheries for the Maritime Provinces; and Prof. A. C. Redfield, of Harvard University.

#### EXPERIMENTAL STATION AT HALIFAX, N.S.

##### *Investigations on Smoking of Fish*

Mr. Hess continued his study of the disinfectant action of smoke in the smoking of fish. Dr. Forbes attempted to determine the nature of the material in the smoke responsible for the colouring of fish, as well as the factors affecting the production of the colour. He also studied (1) the factors involved in the production of the sheen on the surface of smoked fish, and (2) the action of brining in increasing the water and salt content of the fish. Mr. Weld investigated histologically the formation of the pellicle on the surface of the fish, which protects the smoked fish from rapid drying.

##### *Investigation of Fish Freezing*

Mr. MacKay made a study of the action of brine movement on the rate of freezing of fish, and with Mr. Weld went into the question of the effect of the rate of freezing and storage on the quality of the fish as regards separation of water from the other constituents.

Mr. D. B. Finn investigated the transfer of heat from sodium chloride brine to calcium chloride brine in using the former for the freezing of fish and the latter circulating through pipe coils for cooling the former. He also determined the specific heat of haddock muscle.

##### *Investigations on Fresh Fish*

The changes in fish while being kept fresh are of importance for all branches of the industry. Mr. Dauphinee followed these changes as regards hydrogen-ion concentration, ammonia, indol, and hydrogen sulphide, in order to evolve a simple method for rapidly determining the extent of the change, which method might be used in testing commercially the freshness of fish. Dr. Dreyer in the same connection analyzed fish muscle as to its content of ammonia and trimethylamine, which are produced by decomposition. Dr. Huntsman took up the same matter while at the Station at St. Andrews, N.B., as the facilities there for getting fish fresh from the water are very much better than at Halifax. He studied the changes in hydrogen-ion concentration and in decolorizing power over methylene blue, correlating them with the changes in stiffening of the muscle.

##### *Investigations in Canning*

Mr. Ross investigated the canning of lobster paste or tomalley during the fall season in Northumberland strait, and subsequently carried through a long series of experiments in the production of the proper colour, and consistency of the paste. He developed a method for the canning of a proposed standard paste without the use of roe or any other material other than from the lobster to get the required colour, and without the use of any extraneous substance to get the proper consistency. On examination by members of the Sub-Committee on Canning, paste packed by this method was declared to be equal to the best of about two dozen different commercial packs.

Trouble experienced by the shippers of canned lobster in having shipments condemned in England because of a percentage of "springers" among the cans was looked into. An examination of the springers by Mr. Hess showed that these were in as good condition as the usual run of cans and entirely suitable for food. Experiments by Mr. Ross showed that this condition was probably due to the cans not being hot when sealed, too much air remaining in the cans.

### *Investigations in Salting of Fish*

Apart from the consideration of brining in connection with the smoking of fish, Dr. Forbes carried through certain tests concerning the differences in the grades of salt used in the salting of fish. He determined the relative rates of penetration of Malagash and Trapani salts into the flesh of the fish and experimented with the addition of salts of lime and magnesia to Malagash salt so that a very white fish could be produced for the boneless trade.

### *New Products*

Some attention was given to the possibilities of developing new lines for the fishing industry. Mr. Ross canned squid and crabs, and samples of the former were sent to Japan for report as to quality. Mr. H. A. Wilson dried both squid and eels and went into the possibilities of working up markets for these in Italy and in Japan. These attempts have not yet reached fruition.

### *Development of Fishery Apparatus*

A self-feeding smoke producer for the smoking of fish has been developed at the station, largely by Dr. Forbes, and this has been used for the smoking experiments.

A small brine freezer capable of handling from one to two hundred pounds of fish per hour has been worked out largely by the director. It is for use with ice and salt for the cooling of the brine. It involves a new type of circulation past the fish, a new type of circulation through the ice-salt mixture, and a new design of centrifugal pump included in the tank, which is about three feet square.

A new method of holding the fish during brine freezing has been devised by the director. It involves freezing the fish to galvanized plates during slow immersion, the fish being held flat and below the brine in this way.

### *General Investigations*

Weekly and fortnightly collections of plankton, and hydrographic material were continued at two of the stations established by the *Edward E. Prince* in 1925, one in Halifax harbour, and the other in Bedford basin.

#### *Manuscript reports presented:—*

Dauphinee, J. A.—Experiments on the production and the chemistry of wood smoke in connection with the fish smoking industry.

Dreyer, N.B.—Protein changes in pickled and smoked fish.

Dreyer, N.B.—Some observations on smoking fish.

Finn, D. B.—Freezing experiments.

Finn, D. B.—Determination of specific heat of fresh haddock muscle.

Forbes, J. C.—Investigation into the tensile strength of fish muscle before and after treatment.

Forbes, J. C. and Dauphinee, J. A.—Effect of smoke on the tensile strength of fish muscle.

Gee, A. H.—The micro-organisms responsible for the spoiling of fish muscle.

Hess, E.—Influence of smoke and its constituents on the bacteria in the smoke curing of fish.

Wynne, A. M.—The hydrolysis of haddock muscle by trypsin.

### Education

A two weeks' course of instruction was given to a class of twenty-one fishery officials in April, 1926, on the curing of fish by drying and smoking and on the life histories of fishes, together with the scientific basis for the same. The instruction on the fundamental side was given at Dalhousie University by Professors McIntosh, Bronson and Bean and that on the applied side at the Experimental Station by the director assisted by Dr. Forbes and Mr. Hess.

In August, 1926, a two weeks' course for hatchery officers was conducted. Courses in anatomy and physiology of fishes, fish diseases, and fish food were given in conjunction with physics and chemistry. The instruction was given by Professor McIntosh, Dr. Huntsman and Dr. Leim.

An educator was appointed to take charge of the development and organization of the educational work and material was prepared for addresses and for general instruction, including a series of lantern slides bearing on various phases of the fishing industry.

During the year the director gave addresses at Canso, Liverpool, Yarmouth and Halifax. Dr. Forbes and Mr. Tanner lectured at Truro to the Summer School for Teachers. In the fall Mr. Tanner spoke before a teachers' convention in New Glasgow.

### Co-operation

Further advisory committees were formed from local representatives of the fishing industry to cover the fields of smoking and canning. These have proved of very great value for the work of the station. Eight meetings of advisory committees in all were held during the year.

As previously, considerable assistance was received from both Dalhousie University and the Nova Scotia Technical College, the closeness of both institutions to the station forming a considerable asset.

### Improvements

The north half of the upper floor of the station building was finished similarly to the remainder to form a library, a board room, a general office, a director's office, and a special laboratory. The north side of the roof of the boathouse had to be covered with ruberoid. A fence was erected between the part of the King's wharf property occupied by the Station and the remainder on the north. A motor boat of about thirty feet in length was constructed at Tiverton and put into commission during the summer. It was built from the same plans and specifications as the *Delphine* at the Atlantic Biological Station. It has been named the *Clione* after a marine winged mollusk that forms the chief food of the whale in northern seas.

### BIOLOGICAL STATION, NANAIMO, B.C., AND FIELD INVESTIGATIONS

The Nanaimo Station now consists of a group of five buildings located on three acres of land leased for a period of ninety-nine years from the Canadian Collieries (Dunsmuir) Limited. The original building erected in 1908 is now

the Biological residence building. The southeastern portion is of two stories and constitutes the residence of the workers. On the lower floor there is a common room and an office, and on the upper floor, four bedrooms. The north-western portion houses the biological laboratory, with working space for eight persons, a small library, a small photographic dark room, and in the basement, an office, a museum, a storeroom and a lavatory.

The laboratory is equipped with fresh and salt water and gas along one side. An attempt is made to heat the entire building by means of two stoves and a fire-place.

The dining-room-kitchen building is an old roughly constructed structure consisting of two small dining-rooms, a kitchen and pantry on the lower floor and one bedroom upstairs for the female help.

During the winter of 1923-24, a chemical laboratory 36 by 24 was built. This consists of one story and provides working accommodation for about five investigators. It is supplied with fresh and salt water and gas and is heated by a furnace.

A director's bungalow was erected in 1925 and a caretaker's cottage also in 1925.

The buildings are all lighted by electricity generated by a Delco plant. Negotiations are now under way with the Nanaimo Light and Power Company for the extension of the city line to the station. As stated previously, the residence contains but four bed-rooms for workers. Additional accommodation is provided by means of tents and during the past two summers six have been in use. Accommodation for summer help has also to be provided by means of tents.

In 1924 an additional three acres of land lying northwest of the original holding was leased for 99 years from the Canadian Collieries (Dunsmuir) Limited. Tents have been put on the land and it is hoped that in the near future a residence building and cottages for investigators with families may be erected here.

The fresh water supply for the station comes from springs on the hill side to the northwest. During this year a new concrete reservoir has been constructed. In order that this supply should be protected and reserved for the station the Canadian Collieries (Dunsmuir) Limited have granted to the board a ninety-nine year lease of five acres surrounding the source.

In April, 1926, the new sixty-foot motor boat was completed. It contains a 45-50 Petters oil engine and makes about 10 knots per hour. There is sleeping accommodation aboard for eight persons. A gasoline power winch has been placed on the after deck for the operation of dredges and oceanographical apparatus. Aft of the pilot house there is a small laboratory. The boat has been named the *A. P. Knight* in honour of Dr. A. P. Knight.

With the acquisition of the motor boat it has been necessary to employ an engineer throughout the year. We were fortunate in securing the services of Mr. R. G. Good, a young man who has had two years university training and who by reason of this has been able to give considerable assistance with hydrographic work and with technical work in the laboratories. Mr. Groth has been made captain and during the winter months has also acted as caretaker.

Miss E. Keighley was appointed secretary during the past year and the Director thereby relieved of much office and library routine.

The special needs of this station are:—

1. *A Residence Building.*—The present accommodation of four bedrooms is inadequate and further the lodging quarters should be entirely separate from the working quarters. Further the present dining room-kitchen building is too small and inconvenient, and there is insufficient space for accommodation of help. The quarters are very uncomfortable during the winter months.

2. *A Heating Plant.*—An attempt has been made to heat the whole biological and residence building by means of two stoves and a fire-place. Obviously this is impossible, but there is a limit to the number of stoves which may be set up. In conjunction with the installation of a heating system, the biological laboratory, at least, should be lined because when the building was constructed winter occupation was not contemplated and building paper was not placed between the walls so that winds blow through and the rooms are far from being comfortable.

3. *Scientific Apparatus and Publications.*—It is not necessary to specify details here.

With the appointment of the present director, this station has been open throughout the year and a number of researches have been carried out during the fall, winter and spring months in addition to those carried out during the summer.

#### *Researches*

*Systematic.*—This phase of the station's work has been carried forward by a number of workers and in a few years time it will be possible to issue a fairly complete faunal and floral list for the Pacific coast.

Dr. and Mrs. O'Donoghue have studied the Bryozoa, Nudibranchs, Edhino-derms and have commenced with the Decapod Crustacea.

Mrs. C. Berkeley is completing her account of the Annelid worms.

Mr. G. H. Wailes is continuing his exhaustive, illustrated lists of the Protozoa.

Prof. J. R. Dymond has commenced a study of the marine fish.

Rev. Robert Connell is completing a list of the seaweeds.

Other systematic studies completed during recent years have been:—

Hydroids by Dr. C. McLean Fraser, Medusae by Dr. R. E. Foerster.

Isopods by Mr. A. R. Fee, Barnacles by Mr. I. E. Cornwall.

#### *Physical and Biochemical*

Dr. F. D. White studied experimentally the limiting factors during the early life history of the gribble and teredo. He had previously carried out researches along somewhat similar lines in Scotland.

Mr. J. P. Quigley studied the physiological changes occurring when the dogfish, *Squalus sucklii* was transferred to fresh water and modified salt water. This research has a bearing upon the problem of salmon migrations.

#### *Oceanographical*

During the past summer Dr. A. H. Hutchinson, Mr. C. Lucas and Dr. W. A. Clemens commenced a study of the movements of the Fraser river water in the strait of Georgia. Dr. Hutchinson has studied the distribution of the phytoplankton, quantitatively and qualitatively, in this connection. Mr. Lucas has analyzed a very large number of water samples and Dr. Clemens has studied the currents by means of drift bottles.

Temperatures and other data are now being secured from Departure Bay, one station in the strait of Georgia, in the Fraser river near New Westminster, at William Head (south end of Vancouver island), two stations near Prince Rupert, in Ladysmith harbour in connection with the oyster investigation, and along the west coast of Vancouver in connection with the salmon tagging work.

#### *Miscellaneous*

Professor J. R. Dymond has commenced a systematical study of the trout of British Columbia. There has been much uncertainty as to the status of some of the varieties and species of trout and it seemed desirable in connection with

fish cultural work to have these forms definitely delimited. Lack of funds prevented Professor Dymond from going into the field, but arrangements were made with the Fisheries Branch, the Provincial Fisheries Department, the angling associations of the province, and with various individuals whereby specimens were sent to the station. A very large amount of material and information has been received.

Mr. C. Berkeley has commenced a study of marine bacteria. The actions, conditions and existence, etc., of luminescent forms are at present occupying his attention.

Dr. and Mrs. Clemens have continued their studies of the sockeye salmon data collected by the Provincial Department of Fisheries in the Fraser river, Rivers inlet, Skeena river, and Naas river.

### *Field Investigations*

Dr. C. McLean Fraser, assisted by Miss G. Smith, carried out a very comprehensive investigation of the four species of commercial clams in the vicinity of Sidney. This included the spawning periods, rates of growth, distribution, general surveys of clam beds, physicochemical conditions, etc.

Prof. G. J. Spencer investigated the life-history and ecology of the commercial crabs in Clayoquot sound, west coast of Vancouver island. His results show that the mating season in 1926 occurred from April 15 to June 15 and that the close period should cover this period approximately rather than June 15 to August 15 as obtains by present regulations.

Mr. C. R. Elsey has been following closely the conditions of oyster culture in Ladysmith harbour and is obtaining a supply of spat from Japan for experimental study this summer.

Dr. H. C. Williamson has continued his studies of spring salmon migration on the west coast of Vancouver island. Tagging operations over a period of about three weeks in 1925 off Ucluelet showed that the great majority of these fish went to the Columbia river to spawn and some even going as far south as the Sacramento river, California. It seemed desirable to determine if the same distribution occurred throughout the whole season and accordingly Dr. Williamson, assisted by Mr. C. Mottley, carried out tagging operations from early March to late September, 1926. The returns are now being worked up. Mr. Mottley has made a study of the scales of all the fish tagged and in many cases has received scales from the fish when recaptured by the fishermen. Much valuable information has been obtained regarding the life-history of the salmon and data concerning the fishery.

Dr. Williamson has also been carrying out investigation of the Pacific herring, involving studies of races, rates of growth, food, spawning, extent and distribution of spawning areas, etc.

### *Fish Cultural Investigations.*

Fish cultural investigations at Cultus Lake in charge of Dr. R. E. Foerster.

In 1924 with the appointment of Dr. R. E. Foerster a field research station was established at Cultus Lake, eighty miles east of Vancouver, for the purpose of making an intensive year-round study of the fresh water phases of the life-history of sockeye salmon. Later with the formation of the Research Committee of the board, the study was extended to include that of artificial propagation. In the latter connection the following program was approved.

1. In the fall of 1925 the entire run of sockeye to Cultus lake was intercepted, the individuals counted, proportions of the sexes determined, and then allowed to pass into the lake to spawn naturally.

2. In the fall of 1926, the entire run was again intercepted all the fish stripped and the fertilized eggs placed in the hatchery. This spring the fry will be liberated in the lake.

3. In the fall of 1927, the same procedure will be followed as in 1926 but in the following spring, the eyed-eggs will be planted in the gravel beds of the tributary streams according to the method being followed by the Superintendent of Hatcheries for British Columbia.

In each spring the young sockeye migrating seaward will be counted and thus definite data will be obtained as to the efficiency of each method of propagation. It is planned to carry out this procedure over a period of twelve years. A substantial screen fence has been constructed across the outlet of Cultus lake so as to intercept the migrating yearlings. In the spring of 1926 a test was made on the migration and over one and a quarter million yearling sockeye were counted without difficulty. Of these about 100,000 were marked by clipping off the adipose and right ventral fins.

*Fish Cultural Investigations.*—Dr. Foerster and his assistants are now engaged in counting the migrating yearlings resulting from the natural spawning of 5,400 sockeye in 1926. The run of that year consisted of 3,700 females and allowing 3,500 as an average egg production per female there were then over 10,000,000 eggs deposited on the spawning beds.

Dr. Foerster is making a very careful study of all phases of both natural and artificial propagation. In addition he is following the physico-chemical conditions in the lake and obtaining quantitative data on the food supply.

*Eagle River Counting.*—Eggs from the sockeye runs to Cultus lake in the falls of 1921, 1922, 1923 and 1924 were planted in Eagle river, a tributary of Shuswap lake in the Upper Fraser drainage area. In view of Dr. Foerster's familiarity with the Cultus lake race it seemed desirable that counts should be made of the fish going to the Eagle river spawning beds in 1925 and onward and an attempt was made to identify any individuals of the Cultus lake race if they appeared in Eagle river. In 1925 it was impossible to carry out the work because of lack of funds. In 1926 the necessary funds were provided and Dr. Foerster carried out arrangements for making the count. However, only four sockeye appeared. The reasons for the complete failure of the sockeye run to Eagle river in this year are not apparent at the present time. Provision is being made for continuing the work in 1927.

#### EXPERIMENTAL STATION AT PRINCE RUPERT

In March, 1926, temporary quarters were established in the basement of the Mill Boarding House at Seal Cove, which is situated on the outskirts of Prince Rupert. Arrangements here were of a very temporary nature and extensive laboratory work could not be undertaken. For this reason the work was limited to that which could be undertaken within the fish plants themselves and to the planning of the new station.

In November, 1926, the station building which is situated on the Provincial Government wharf was completed and officially opened by Mr. J. J. Cowie in the presence of the Western Sub-executive Committee and representatives of the industry. The building cost approximately \$14,000, of which \$5,000 was donated by the Provincial Government, who also granted a free site.

The building is sixty feet long by thirty-six feet wide. It is two stories high and is surmounted by a large easily accessible attic which is used for storage purposes. The main floor is concrete covered, and will eventually be partitioned off to form a museum, a laboratory for heavier apparatus, and a work shop. The second floor contains offices, library, chemical laboratory, balance room,

constant temperature room, biological laboratory and photographic dark room. It is equipped throughout with hot water heating, electric service for light and power, gas, hot and cold water, and compressed air. The station also possesses a thirty-four foot gasoline launch for the collection of material.

### Investigations

**Refrigeration.**—Refrigeration presented many urgent problems to the industry who were desirous of learning more of the brine freezing system. Accordingly arrangements were made with the Canadian Fish and Cold Storage Co for the erection of a small brine freezing plant on their premises at Seal Cove. Funds being limited, an existing wooden tank in which the Company had unsuccessfully tried to use the brine freezing method, was remodelled. It was found necessary to thoroughly insulate the tank, to fit it with a sheet metal lining, to install a new system of brine circulation and cooling coils, and to equip it for freezing by the method of indirect immersion, using calcium chloride brine at a temperature of  $-10^{\circ}\text{F}$ . By this means it was found possible to reduce the freezing time of a 30-pound fish from forty hours (which was usual in the sharp freezer) to two hours. It was hoped to be able to obtain accurate cost data from this machine, but owing to its location within the plant and to other adverse circumstances over which we had no control, this was found to be impracticable.

The installation proved highly successful in convincing the trade, which was at first skeptical, of the feasibility of the method, and of the marked superiority of the brine frozen product. At a demonstration which was attended by the leading men of the Industry, it was shown that to the naked eye, brine frozen halibut is almost indistinguishable from unfrozen fish, while the appearance of air frozen halibut is markedly inferior and extremely obvious. It was also demonstrated that upon squeezing a thawed out steak of air frozen halibut, 20 per cent of its weight was lost in the form of escaping juices. A similar experiment with brine frozen fish resulted in a loss of 5 per cent, while fresh unfrozen fish lost only 3 per cent of its weight. The reason for this loss was then shown by a microscopical examination of the muscle fibres which in the case of the air frozen fish were badly ruptured, and showed large intra cellular distentions, while in the brine frozen and fresh fish the sarcolemma was intact with a marked absence of holes and spaces in the muscle substance.

Having demonstrated this to the trade, it was decided to conduct an experiment in marketing, and thus to find the reaction of the retailer and the public to the new product. As a preliminary, a small quantity of halibut (4,000 pounds) was frozen in the new machine, and stored for about one month, after which it was shipped in 200- and 300-pound lots to various dealers in Montreal, Toronto, Winnipeg and Chicago. The fish were placed on the market in the thawed out condition and sold in competition with fresh unfrozen fish. In some cases it is known that it was sold as fresh fish at fresh fish prices, and in every case the dealer noted the marked superiority of the new product.

This exploratory work indicates that a similar effort on a larger scale would do much towards creating a demand for the new product, and at the same time points to the necessity of accurate data with regard to costs, which in these experimental stages are bound to be a little in excess of the sharp freezing method.

The station is at present occupied with the design of a new automatic type of freezer which can handle all types of fish with a minimum of depreciation and labour cost. This machine will be installed in a manner that will make possible the obtaining of all necessary engineering data as to cost of installation and cost per pound of fish frozen.

**Oils.**—The dog-fish (*Squalus sucklii*) is plentiful on the Pacific coast, and on account of its voraciousness has become a pest. Many attempts have been

made to utilize it, and thus protect more valuable food fish. Plants erected for the production of dog-fish meal and oil have never been very successful, largely because of the inadequate methods used.

The station has undertaken an examination of the production of oil and meal with a view to so improving the methods as to make the reduction of dog-fish profitable. This work is being conducted by Mr. H. N. Brocklesby.

A thorough chemical examination of the oil has been made and forwarded in a paper to the Journal of the Society of Chemical Industry, for publication. Amongst other things it was found that this oil lends itself very rapidly to sulphonation, a process which makes it very valuable to the leather and tanning industries, which have not used it heretofore because of its objectionable odour. This however is removed by improved processing, which also makes it more valuable for use in outside and heat resisting paints.

When hydrogenated, this oil forms an odourless, tasteless pale yellow edible fat, which could be used for food purposes. This fat could be used in the manufacture of fine toilet soaps, while the unhydrogenated oil is valuable for the production of washing powders and laundry soap. Thus numerous new markets for the oil might be found as a result of improved methods of manufacture.

Examination of the vitamin potency of the oil shows that dog-fish oil is more potent in vitamin A than is standard medicinal cod liver oil as prepared by Park Davis Co. This work was made the subject of a paper which has been forwarded to the Journal of Biological Chemistry for publication. An assay of Vitamin D is now being undertaken, both at the station and at the Manitoba Agricultural College, where Mr. F. G. Hutt is experimenting with young poultry. The results obtained will first be published in technical form, after which they will be embodied in a more general paper for the use of the trade.

*Survey of Fish Plants.*—During the summer of 1926, Mr. Pillsbury was appointed to conduct a survey of the methods and processes, which are in use at the various fish handling plants. The time at his disposal permitted of his covering the plants in the vicinity of Prince Rupert and the Skeena river.

*Museum.*—Work has also been started towards the establishment of a museum, which is to include models illustrating the evolution of methods of processing, especial emphasis being placed on the most recent advancements. Specimens of marine life from local waters have been collected, and an effort is being made to enlist the aid of halibut fishermen in this connection. Two specimens worthy of note have been obtained as a result of this.

A handsaw fish (*Plagyodius aesculapius*) caught off Anthony isle in 40 fathoms, and a prow fish (*Zaprora silenus*) caught off Sitka sound, in 60 fathoms.

### *Season of 1927-28*

During the coming season the work planned is as follows:—

The development of a small commercial brine freezer embodying automatic features which make possible the freezing of all types of fish at low cost, and the gathering of cost data.

An experiment in the marketing of brine frozen fish.

Further study of the physical and chemical changes which occur in fish proteins during freezing and thawing.

A study of the conditions which lead to the discoloration of halibut in the holds of fishing vessels.

A study of the chemical changes in fish oils and fats which accompany the discoloration known as "rusting."

A study of the vitamin content of dog fish liver oil and its seasonal variations with special reference to Vitamin D.

A study of the glue content of reduction plant waste liquor and of a method for its recovery.

If time permits, studies of the chemical characteristics of pilchard and salmon oil will be made.

#### INVESTIGATIONS IN THE PRAIRIE PROVINCES

Professor C. H. O'Donoghue, of the University of Manitoba, had under his direction certain investigations in the Prairie Provinces, particularly in the Jasper Park lakes. During the summer of 1926 Dr. F. B. Adamstone was appointed as an Investigator in the Prairie Provinces. He shortly resigned and was succeeded in the fall by Mr. A. Bajkov.

Those engaged in these investigations in 1926 and their problems were:—

Mr. A. Bajkov: Fishes and plankton of the Jasper Park lakes. Limnological investigations on the Quill lakes in Saskatchewan and lake Winnipeg.

Miss Ruby Bere, University of Manitoba: The leeches of the Jasper Park lakes.

Mr. Alan Mozley, University of Manitoba: The molluscs of the Jasper Park lakes.

Mr. Ferris Neave, University of Manitoba: The insects of the Jasper Park lakes.

## APPENDIX No. 3

## NATURAL HISTORY REPORT

By Mr. ANDREW HALKETT, *Naturalist*

The main subjects summarized in the report, and which are drawn upon from material contained in previous detailed official reports, are these:—

Scallop investigations made (1) in Mahone Bay, (2) in the vicinity of Ecum Secum.

Oyster investigations made (1) in Tracadie Harbour, (2) in Ostrea Lake, (3) in various localities in Nova Scotia and New Brunswick in conjunction with other work.

An investigation as to how the so called slipper limpet (*Crepidula*) effects the oyster.

An examination of the condition of the quahaugs as they occur from Shediac to the limits of their range at Buctouche Bay, owing to an alleged dying of the quahaugs at Buctouche.

## SCALLOP INVESTIGATIONS MADE IN MAHONE BAY

There was a double purpose to be served in making the scallop observations last year in Mahone Bay. One purpose concerned the usual annual investigation as to the condition of the scallop, so as to observe to what extent it has been recovering from the strain put upon it a number of years ago; and the other was to make a large collection of the shells so that, under the supervision of Doctor Huntsman, the apparent ages of the scallops as they run in sizes may be determined.

The amount of time devoted to the investigation was consequently greater than that of any previous occasion, and the fortuitous collecting of a large series of the shells seemed to manifest, through the proportion in numbers of scallops below four inches in size to those from four inches and over, that the scallops were recovering from the strain.

In this way the time devoted to collecting and examining the shells supplemented the regular investigation, and brought certain things to light as to what the actual state of the scallop now is in Mahone Bay.

Two separate collections of the shells were made: first during June and July, and second after the interval of one month in August.

Under the first collecting (June and July) the proportion of scallops under four inches to those from four inches and over was nearly two-thirds of the whole.

Under the second collecting (August) the proportion under four inches was less than that of those from four inches and over, but this might be an indication that in the intervening time the scallops were gaining in size. The percentage of the smaller ones was  $37\frac{1}{2}$ —that of the larger  $62\%$ .

Under the entire time of the collecting the proportion under four inches was about  $51\frac{5}{7}$  per cent, and of those from four inches and over about  $48\frac{2}{7}$  per cent.

But there is something else to be considered in any attempt to ascertain whether or not the scallop resource in Mahone Bay is undergoing recovery.

The observations were entered upon from three different starting points, viz:—Indian Point, Ernst Island, and Tancook, and the proportion of the smaller scallops to the larger ones, according to those starting points, differed very materially.

The first investigation starting from Indian Point was made on the 24th and 28th of June, and also on the 16th of July, and out of two hundred and ninety-six scallops obtained, two hundred and forty-eight were below four inches and forty-eight were from four inches and upwards in size.

The first investigation starting from Ernst Island was made on the 15th of July, and out of seventeen scallops obtained two were below four inches and fifteen were from four inches and upwards in size.

The first investigation starting from Tancook was made on the 8th and 12th of July, and out of eighty-nine scallops fourteen were below four inches and seventy-five were from four inches and upwards in size.

This comparison tends to show that the real recovery, as manifested by the numbers of small scallops, is at the Indian Point region, which is situated at the western end of the bay. From the Tancook starting point there were only fourteen scallops below four inches out of eighty-nine, and from the Ernst Island starting point, intermediate between Indian Point and Tancook, only two below four inches out of seventeen.

The observation, however, made at Ernst Island was apropos or by the way on return from Tancook, but it led to a fuller observation at that place when the second investigation was made.

The second investigation starting from Indian Point was made on the 16th of August, and out of one hundred and eighty-seven scallops obtained, one hundred and nineteen were below four inches and sixty-eight were from four inches and upwards in size.

The second investigation starting from Ernst Island was made on the 20th and 21st of August, and out of seventy-two scallops obtained six were below four inches and sixty-six were from four inches and upwards in size.

The second investigation starting from Tancook was made on the 25th and 26th of August, and out of one hundred and twenty-six scallops obtained eighteen were below four inches and one hundred and eight were from four inches and upwards in size.

By paralleling the smaller and larger scallops obtained on the two occasions from the three starting points an idea may more readily be had of that which is embodied in the above, thus:—

Indian Point		Ernst Island		Tancook	
Smaller	Larger	Smaller	Larger	Smaller	Larger
1st.....248	48=296	2	15=17	14	75= 89
2nd.....119	68=187	6	66=72	18	108=126

Any considerable difference in the percentage of the small scallops pertains to those obtained from Indian Point as a starting point. On the first occasion the percentage stands almost eighty-four, and on the second almost sixty-four. As the number of the small ones of those from Ernst Island and Tancook starting points is inconsiderable they are taken together. On the first occasion the percentage stands about fifteen, and on the second about twelve. This fall in the numbers of the small scallops may be accounted for owing to an increase in size in the intervening time.

Two misplaced scallops are left out of account in the above estimates.

## TABULATION OF RAKINGS MADE IN JUNE AND JULY

Rakings	Males	Females	Totals
1.....	7	7	14
2.....	12	13	25
3.....	3	3	6
4.....	19	29	48
5.....	20	16	36
6.....	33	29	62
7.....	16	17	33
8.....	0	0	0
9.....	4	7	11
10.....	6	10	16
11.....	12	6	18
12.....	15	3	18
13.....	15	9	24
Rake fouled odd.....	2		2
14.....	2	1	3
15.....	6	4	10
16.....	2	2	4
17.....	6	3	9
18.....	12	12	24
19.....	19	20	39
	211	191	402

## TABULATION OF RAKINGS MADE IN AUGUST

Rakings	Males	Females	Totals
20.....	38	35	73
21.....	14	10	24
22.....	42	48	90
23.....	2	9	11
24.....	4	3	7
25.....	2	3	5
26.....	1	2	3
27.....	9	17	26
28.....	1	5	6
29.....	5	4	9
30.....	3	2	5
31.....	1	0	1
32.....	38	34	72
33.....	5	2	7
34.....	1	0	1
35.....	24	21	45
	190	195	385

considerable difference in the percentage of the small scallops per-  
 centage stands about eighty-four, and on the second almost  
 1. As the number of the small ones of those from East Island and  
 from the percentage stands about fifteen, and on the second about  
 This fall in the numbers of the small scallops may be a  
 placed scallops are left out of account in the above estimate

Tabulation showing the numbers of yards over which the rakes were drawn and the number of scallops obtained in each raking. \* indicates that two rakes were used—otherwise one rake.

Rakings	Scallops	Yards
1.....	14	300
2.....	25	200
3.....	6	300
4.....	48	250
5.....	36	200
6.....	62	200
7.....	33	300
8*.....	0	400
9*.....	11	400
10*.....	16	600
11*.....	18	200
12*.....	18	400
13*.....	24	500
Rake fouled odd.....	2	.....
14.....	3	200
15.....	10	200
16.....	4	100
17.....	9	300
18.....	24	300
19.....	39	300
20*.....	73	800
21*.....	24	600
22*.....	90	500
23.....	11	125
24.....	7	125
25.....	5	125
26.....	3	200
27.....	26	200
28.....	6	200
29.....	9	200
30.....	5	250
31*.....	1	400
32*.....	72	450
33*.....	7	150
34*.....	1	300
35*.....	45	300
Add—misplaced.....	2	.....
	789	10,575

#### SCALLOP INVESTIGATIONS MADE IN THE VICINITY OF ECUM SECUM

These investigations were commenced on the 9th and completed on the 15th of September, but the occurrence of the scallops at Ecum Secum, according to what I had been led to anticipate finding, did not come up to my expectations. I found there was nothing really special about the occurrence of the scallop there, and doubtless scores of places might be found to be equally as good.

The following is a summary of the rakings, showing the numbers of yards over which the rakes were drawn and the number of scallops obtained in each raking:—

Rakings	Scallops	Yards
1 g.c.....	0	440
2 o.f.....	2	400
3 o.f.....	0	600
4 g.c.....	33	500
5 g.c.....	15	550
6 h.c.....	0	400
7 h.c.....	0	250
8 o.f.....	0	600
9 h.c.....	0	200
10 h.c.....	8	300
11 h.c.....	3	300
12 h.c.....	34	400
13 h.c.....	19	350
14 g.c.....	18	375
15 g.c.....	0	250
16 g.c.....	74	500
17 o.f.....	1	400
18 o.f.....	0	650
19 o.f.....	0	700
20 o.f.....	0	50
21 o.f.....	0	350
	207	8,565

The following is an analysis of the above:—

In the open, facing the harbour and village of Ecum Secum, out of 8 rakings (viz. 2, 3, 8, 17, 18, 19, 20, 21) drawn over 3,750 yards (viz. 400, 600, 600, 400, 650, 700, 50, 350) only 3 scallops were obtained.

Under more shelter on the Halifax county side, out of 7 rakings (viz. 6, 7, 9, 10, 11, 12, 13) drawn over 2,200 yards (viz. 400, 250, 200, 300, 300, 400, 350) 64 scallops were obtained.

Under more shelter on the Guysboro county side, out of 6 rakings (viz. 1, 4, 5, 14, 15, 16) drawn over 2,615 yards (viz. 440, 500, 550, 375, 250, 500) 140 scallops were obtained.

To facilitate a better understanding of the tabulation, symbols are placed against the numbers of the rakings: o.f. signifying, in the *open facing* the harbour; h.c. on the *Halifax county* side under more shelter; g.c. on the *Guysboro county* side under more shelter.

It will be seen, as shown below, that the total number of scallops obtained for Doctor Huntsman's purpose (in the procuring of which  $10\frac{7}{8}$  miles were dragged) was 996 or four shells short of 1,000. This means approximately 1,000 shells or 2,000 valves, thus:—

Mahone Bay—June and July 402: August 385:—Misplaced 2.....	= 789
Ecum Secum.....	= 207
	996

Whilst engaged in oyster observation at Ostrea lake I was shown a scallop shell  $2\frac{3}{10}$  inches in length which had been taken with a spear at Widgeon Gut about the 15th of May.

#### OYSTER INVESTIGATIONS MADE IN THE WEST ARM OF TRACADIE HARBOUR

In the season's work nothing proved to be more interesting than the examination as to the occurrence of the oyster in Tracadie harbour.

The data in full of this investigation are given in a previous report, but I now give a resume or condensed statement concerning the oyster as it exists in this harbour.

The body of the harbour runs off into innumerable irregularly shaped branches or arms, the most important of which as concerns the oyster is known as the West arm.

This arm has a length of about one and a third nautical miles and breadths of great irregularity, in places varying say from a fourth to half a mile. Its maximum depth may be placed at about ten feet. There is little tidal rise and fall, owing to the small entrance space connecting the arm with the main body of the harbour, which in turn is affected by the narrowness of the main entrance connecting the harbour with George Bay. The nature of the sea bed easterly is mostly composed of mud: westerly there are stones, but mud heavily charged with diatoms, is conveyed by streams (of which there are three, besides which there is a good spring reputed never to go dry) or drained off the land, and discharged practically all over the area, which is situated in an undulated spot, the land gracefully sloping on all its sides.

Observations of the West arm were made when in boats out on the water, and also by looking down upon it from a high altitude. In the latter way such an excellent view of the arm and the surrounding landscape was had that a better idea was afforded of the topographical features of this beautiful spot, and the observation of its physical or topographical environment, where the water is held by the surrounding undulated land as in a basin, was of value in my study of the oyster as it lives and thrives in this choice arm of Tracadie harbour.

As to the oyster itself, favoured as it is by much that conduces to its welfare, it is free from a great deal that in many other localities is detrimental or injurious to it, but at the same time there are, according to the present natural constitution of the arm, certain things that hinder it from being all that it might be brought to be.

The Tracadie oysters are generally more or less elongated in shape, whitish in colour and overlaid with mud, and they are almost entirely devoid of any extraneous objects. Starfishes, those inveterate enemies of the oyster, are apparently absent, a plenteous supply of fresh water renders the water brackish, and there is an abundant supply of food composed of numerous kinds of diatoms.

There is, however, over a very considerable portion of the arm, especially at the eastern portion, a deficiency of objects upon which the spat can attach itself, and this condition involves a question which has been dealt with in detail in my previous oyster report.

One striking phenomenon which this condition occasions is that many of the oysters are simply lying loose upon the sea bed without being attached to any objects at all, and the waste undoubtedly engendered owing to this is fully pointed out in the above mentioned report.

My work in the evenings was devoted to an examination of the oysters as they lay exposed in the shell valves. As the oysters in general lay open before me I saw that they were compact and full. This was on account of their having had time to recover from the impoverished appearance that shellfish in general assume during the spawning period.

But although the oysters were practically spawned out, in some there were still a few sperms remaining, but in none did I see any eggs. This was something not altogether new to me, for as late as October in the previous year at Buctouche I came across a similar instance of an oyster having sperms still in the gonad. The American oyster is protandrous (which signifies that it is first male) in so far as that the gonad is heavily charged with sperms before it is charged with eggs, but I have reason to know through close examination that after the eggs are discharged (a function which is performed in a relatively short time) many of the individual oysters still have the gonad charged with sperms, and there is I believe in regard to this question room for a close and special study.

## OYSTER INVESTIGATIONS MADE IN OSTREA LAKE

The general features of Ostrea lake differ entirely from those of Tracadie harbour. It is a sort of marine pond, constituting an arm of Musquodoboit inlet, being connected with the main inlet by a narrow channel, yet it is also in its own way a natural habitat of the oyster.

This pond is at least a mile and a half long by at least a quarter of a mile broad on an average. The composition of the sea bed is largely sand and rock, depths taken were two and one-half, four and six feet, and the highest rise of the tide is about one foot. It is practically full of heavy growths of eel-grass, mare's tails, and sea-weeds. A considerable stream, which issues from a fresh water lake and empties into the pond, is the principal source of supply of fresh water, but there is another insignificant stream at the further end of the pond which is simply fed by water drained off the land.

The oysters of Ostrea Lake are of good quality, but the dense growth of eel-grass, etc., is an obstacle in the procuring of them. Samples were obtained, however, at three spots in particular, and if means could be devised of keeping down the dense vegetative growth, I am satisfied that Ostrea Lake would afford, according to its size, a good oyster supply from a limited area.

OYSTER INVESTIGATIONS MADE IN VARIOUS LOCALITIES IN NOVA SCOTIA AND  
NEW BRUNSWICK

These are divisible into two separate investigations, viz., (a) Caribou River, N.S., and (b) that part of the Strait of Northumberland, N.B., embraced between, and including, Shediac and Richibucto.

*(a) Caribou River, Pictou County, N.S.*

Little could present a greater contrast than is to be seen in a comparison of the Caribou River oysters with those of Tracadie Harbour, and the difference in their appearance is very marked. Those of Tracadie Harbour were found to be almost entirely free of objects of any kind attached to them, whereas those of Caribou River had great numbers of very small oysters attached to the larger ones. This was so much the case, and there was such a close contact of the small ones on the large, which were often so closely and intimately attached and massed together to the large ones, that it seemed to me it would be impossible to remove them without incurring great waste.

Great numbers of fine oysters were seen and examined at Caribou River, and that much profitable fishing had been engaged in was manifested by the heaps of dead oyster shells which were seen along the bank of the river.

*(b) That part of the Strait of Northumberland Embraced Between  
Shediac and Richibucto*

These investigations were largely made at wharves, canneries and packing-houses, and as I was brought in contact with parties engaged in the oyster business, through those means I gained a widened conception of the condition of the oyster as it exists between the aforementioned limits, and indeed of oysters brought in from places beyond those limits.

The following is a summary of the visits made, and wherever I went or in whatever way the examinations were made, at wharves, in barrels, or in the process of canning, in general I beheld multitudes of oysters in excellent shape.

A visit was paid to Doiron's warehouse at Shediac, where a large quantity of fine oysters which had been obtained at Shediac Bay and Aboushagan were seen.

The oysters at Bilodeau's cannery and also those at Cormier's cannery at Cocagne were inspected.

The oysters at the four packing houses at Buctouche were also inspected, at all of which there were oysters from Buctouche Bay, and at two of them oysters from the Richibucto district.

A visit was paid to Cyrille Maillet's packing house at Buctouche Bay which is distant a few miles from Buctouche town, and where oysters from Buctouche and Kouchibouguac, a place about six miles beyond St. Louis, were seen.

Oysters from Richibucto and Kouchibouguac's rivers, or neighbouring waters, were examined at C. Wilkinson's warehouse at Richibucto.

#### AN INVESTIGATION AS TO HOW THE SO-CALLED SLIPPER LIMPET (*CREPIDULA*) AFFECTS THE OYSTER

This investigation was incidental to the oyster investigations.

It was an outcome of a correspondence of about a year ago between the Canadian Trade Commissioner of Bristol, England, and the Director of the Commercial Intelligence Service, and between the latter and this Department.

The matter in question concerned what effect the slipper limpet which attaches itself to the outside of the shell of the oyster, has upon the oyster, and it was decided that I could give the question attention in so far as it would not infringe upon that which was more immediately before me to be engaged in.

I found that instead of my search for *Crepidula* impeding the work devoted to the condition of the oyster at respective places, it was more auxiliary to it, as in any case I was constantly on the lookout for whatever extraneous objects were adhering to the oysters, and I also found that it is apparently very locally distributed, so much so that there are very many places where the oyster occurs without any evidence that at those places *Crepidula* occurs.

There are two distinct species of *Crepidula* at our Atlantic coasts, one of which is smaller and much flatter than the other, and of which only a few specimens were come across.

The larger species exists in great abundance locally. It was first come across casually whilst I was engaged in my scallop observations at Mahone Bay. On a few occasions I found it on scallops at one particular place of that bay, but there was no indication that it was there in plenty.

From that time on, and throughout rather an exhaustive examination of oysters at Ostrea lake, Tracadie harbour, Caribou river, Shediac, Cocagne, Buctouche, and Richibucto, *Crepidula* was found only at Cocagne and Buctouche.

At those two places it was found in great abundance, and not only was it found directly on the oyster, but as there were individuals of various sizes, smaller ones often adherent to the full grown ones or smaller again to these.

I do not see that actually the slipper limpet does the oyster the slightest harm. At the most it is only a competitor of the oyster. Both feed on diatoms, and as there is wherever I have investigated a plentiful supply of diatoms to meet the needs of the two there seems to be nothing to indicate that the slipper limpet is in anyway a parasite, and if not then it would seem that no real harm to the oyster can be occasioned through it.

#### AN EXAMINATION OF THE CONDITION OF THE QUAHAUGS AS THEY OCCUR FROM SHEDIAC TO THE LIMITS OF THEIR RANGE AT BUCTOUCHE BAY

This examination was occasioned through an alleged dying of the quahaugs at Buctouche, and as I have frequently been approached by a similar report I gave the matter my close attention.

What I found was that there are more dead quahaug shells than living quahaugs in Buctouche Bay, which might be accounted for through the

accumulation of the shells over a relatively long period of time, but as to the quahaugs themselves I found them to be in good condition.

Probably the number of men who have engaged in fishing in that bay, and the number of quahaugs that have been taken has been more than the resource could bear, but that they have been carried off through an epidemic, which was reported to be the cause of the trouble, appeared not to be substantiated by anything I was able to observe.

As the trouble was alleged to have extended to Cocagne, I made a close examination of the condition of the quahaugs as they occur over the entire area from Shediac to its limits at Buctouche Bay, and wherever I went I found them to be in first class condition.

My oyster and quahaug investigations over this particular part of the strait were made together, and the condition of the one was equally as good as that of the other. There was nothing wrong with the oysters, and I heard nothing as to their having been visited by an epidemic. Yet in all probability an epidemic among the quahaugs would have affected them too.

In the course of the fiscal year various natural history questions were referred to me for replies. These were from Departments of the service or from private individuals, and the answers were submitted in letters for signature or as memoranda. Now and again letters addressed to myself reached me when engaged in my work in the Maritime provinces, and answers to such were sent to the parties as well as, under the circumstances, my memory served me.

## APPENDIX NO. 4

REPORT ON FISHWAYS AND REMOVAL OF OBSTRUCTIONS, BY  
CHAS. BRUCE, FISHERIES ENGINEER

The following report furnishes in detail information regarding inspections, construction of fishways and removal of obstructions to the ascent of fish.

## NOVA SCOTIA

1. Mersey River, Queens County.—Improvements were made to the fishway at Potanoc Dam by the construction of a concrete wing wall to lead fish into the entrance.

A low dam was built at the outlet of the overflow from the power house flume dam at Cowies Falls to prevent salmon from ascending this stream, where they became stranded on the flow being shut off.

2. Hubbards River, Halifax County.—An opening was cleared through an old unused dam to allow fish to pass.

3. Belfrey Gut, Cape Breton County.—The passage from the sea at this location fills up at intervals due to heavy storms shifting the gravel forming the shores, the smelt fishery being seriously interfered with thereby. An opening was made through the bar, allowing smelt to enter.

4. Nictaux River, Annapolis County.—Some work was done on the falls on this river last year. The expenditure this year was for continuation of the former work and included blasting and the construction of concrete wing dams to provide a passage for salmon.

5. Barrys Brook, Lunenburg County.—Removal of obstructions consisting of debris, logs, etc.

6. Grahams River, Inverness County.—Removal of obstructions consisting of log jams filled with debris.

7. Lamey's Brook, Inverness County.—Removal of obstructions consisting of log jams and debris.

8. Salt Brook, Inverness County.—Removal of obstructions consisting of debris piled in by freshets.

9. McLennan's Brook, Inverness County.—Removal of log jams and debris which obstructed passage for fish.

10. Alder Brook, Inverness County.—Removal of obstruction to fish consisting of debris.

11. McKenzies Brook, Inverness County.—Removal of obstructions consisting of jams of logs and debris.

12. Medway River, Queens County.—Repairs to the channel leading to the fishway at Salters Falls.

13. Meadows Brook, Cape Breton County.—Removal of obstructions consisting of debris, logs, etc.

14. River Phillip, Cumberland County.—Repairs to foundations for racks to prevent the ascent of salmon into the tailrace and waste gate, and setting racks.

15. Porters Lake, Halifax County.—Opening of a passage through bar to permit the passage of smelt.

## NEW BRUNSWICK

1. Magagadavie River, Charlotte County.—Preparation of plans for a fishway over falls at mouth of river.

2. Pocologan River, Charlotte County.—Blasting and construction of concrete wing dams to provide a fishway over falls.

3. New River, Charlotte County.—Blasting of falls to improve passage for salmon.

4. Black River, St. John County.—Blasting of falls to improve passage for salmon.

5. White Marsh Creek, Carleton County.—Examination of stream and measurements of discharge.

#### PRAIRIE PROVINCES

Owing to the unsatisfactory condition of numbers of fishways in dams in Prairie Province rivers an inspection of the more important was made. Following the inspection I interviewed the Chief Engineers of both the Canadian National and Canadian Pacific Railways and arranged with them to construct new fishways in the dams owned by the railways.

Designs for fishways have since been furnished to the Canadian National Railways for Gravelbourg river, Saskatchewan, Ochre river, Pipestone river and Vermilion river, Manitoba, and to the Canadian Pacific Railway for Vermilion river, Alberta, and for two fishways on the Whitemud river at Gladstone and Westbourne, Manitoba.

Due to the lateness of the season, inspections were confined this year to the more important streams but it is the intention to advance this work further as opportunity permits.

#### BRITISH COLUMBIA—REPORT OF J. McHUGH, RESIDENT ENGINEER

Expenditures in connection with the removal of obstructions to the ascent of salmon in the streams of British Columbia during the calendar year 1926 were considerably lighter than they have been for several years.

The only major obstructions reported during the year were those at Stamp River Falls, Vancouver Island, and the Bridge River Falls on the Fraser River. At each of these points it became necessary in consequence of the accumulation of sockeye and their inability to proceed further upstream naturally, to devise means whereby they could be safely transported to the smooth waters above the falls. These difficulties were satisfactorily overcome and large quantities of salmon were carried by hand and placed safely above the obstructions. Throughout this work it became very apparent that an early endeavour should be made in each case to overcome these natural obstructions by the construction of suitable fish ladders. Surveys were made and plans prepared for fish ladders at each point. These plans have already been approved by the Department, and the necessary authority has been granted to proceed with their construction during the year 1927 just as soon as conditions are suitable.

It is expected that the work outlined for the Stamp River Falls will satisfactorily and completely relieve that situation. The work outlined for the Bridge River Falls on the Fraser River is, however, of a much smaller nature, and is only designed to alleviate the serious condition which exists at extremely low water when salmon undoubtedly cannot proceed further. The general situation at the Bridge River Falls and at Hells Gate is to receive during the coming year, close attention by a body of Departmental Engineers, who will advise the Department when their studies have been completed. There has been so much said both for and against proposals suggested by the Engineering Service of this Department that in view of the extreme gravity of both these situations and the tremendous issues at stake, the Department has wisely decided to bring other Departmental and Provincial Government engineers into the question, so that there may be no doubt whatever that the recommendations

made by this body of Engineers will be the best possible under the circumstances.

The minor obstructions which were from time to time reported and which in general consisted of accumulated masses of logs and rocks and other debris, were all dealt with at the proper time. Local labour was used entirely for these smaller works, which were generally supervised by the local Overseer or Guardian. As a result, the streams affected were all restored as far as possible to their normal conditions and the fish entering them on their ascent were enabled to proceed to their spawning grounds without further hindrance. The names of all the streams on which work was performed, together with the amounts expended in each case is appended herewith:—

Stream	Nature of Work	Expenditure
Dean river.....	Removal of obstructions.....	\$ 23 75
Coldstream.....	" ".....	28 00
Indian river (Graham reach).....	" ".....	52 36
Coal creek.....	" ".....	74 00
Bush creek.....	" ".....	24 00
Alouette river.....	" ".....	102 00
Alpha bay.....	" ".....	51 10
Juskatla Inlet (Masset).....	" ".....	57 50
Chewat lake.....	" ".....	52 00
Thames creek.....	" ".....	2 00
Oke-over-ara.....	" ".....	69 37
Trout lake (Gerrard).....	Inspection.....	99 79
Eagle river (Stillwater).....	".....	11 00
Frost Creek (Cultus).....	".....	24 75
Okanagan fishway.....	".....	31 95
Fraser river (Hells Gate).....	".....	17 90
Fraser river (Bridge river).....	Inspection and transporting fish over falls.....	217 92
Stamp river.....		1,606.02

The only fishways constructed during the year were those at the outlet of Prospect lake, Vancouver island, where some years ago, two dams were constructed by the British Columbia Cement Company, Limited, for the purpose of maintaining sufficiently high water throughout the year for the carrying on of the industry throughout the year. Neither of these dams had ever been furnished with suitable fish ladders and in consequence of representations made by the Victoria Fish and Game Association an arrangement was reached whereby this association and the cement company would jointly provide the necessary funds for their construction. Plans and estimates for these structures were prepared in this office and the works completed in a very satisfactory manner. Reports from the ground indicate that trout are able now to proceed into Prospect lake to their spawning grounds.

#### COWICHAN LAKE HATCHERY

Certain necessary work in connection with renewals and repairs to the Cowichan Lake hatchery were performed during the year. New floor joists and a complete new floor in the hatchery building were provided, together with a new head tank. The floors of both hatchery verandahs were also renewed and the foundation of the superintendent's residence replaced. An office was also provided for the superintendent in the upper story of the hatchery building. The total cost of this work amounted to the sum of \$433.93 and the work was performed by local labour under the direct superintendence of the engineers.

#### SKEENA RIVER HATCHERY

A new rock filled timber crib 95 feet in length 8 feet wide and 6 feet high was constructed on Granite creek immediately above the main intake. Peeled cedar logs and iron drift bolts were used in this construction. Foundations

were properly prepared and large quantities of brush used with the rock filling. The heavy spring freshets in this stream are responsible for the damage caused from time to time and the construction of this crib was necessary to conserve the water supply of the hatchery, the natural tendency of the stream being to gradually work to the opposite bank, away from the intake. The total cost of this work amounted to the sum of \$912.35 and was performed by local labour.

#### PEMBERTON HATCHERY

The work performed at this establishment during the year was for the purpose of deflecting the Birkenhead river from its threatened erosion of the Pemberton hatchery grounds. A large log jam was removed and a by-pass excavated through heavy boulders in the river, thereby relieving the pressure on that side of the river on which the hatchery is built and reducing the danger from wash and scour. This work was performed at the cost of \$531.76 under the direct supervision of the engineers.

#### GERRARD HATCHERY

A careful inspection of the conditions on Trout lake adjoining the Gerrard hatchery was made during the year in company with the Public Works engineer for the Nelson district with a view to dealing with the condition of drift logs on Trout lake which have been and are still a continual menace to the hatchery fence and also to the small boats which ply on the lake. It was agreed that the most satisfactory method of dealing with the condition was to boom these drift logs in certain sheltered places on the lake shore and the Public Works Department has made recommendation for an annual grant to be made for this purpose from year to year, until the danger of the situation has been overcome.

The following work for the Biological Board occupied a considerable amount of the engineers' time during the year.

#### COUNTING FENCE, CULTUS LAKE

The annual report of the Engineering Branch for the year 1925 contained a detailed description of this counting fence which had only been partially completed and which it was then expected would be finished early in the year 1926, in order that it might be tried out in the 1926 yearling migration. This count was intended to be more or less in the nature of an experiment which would indicate defects which might be remedied during the year so as to assure a correct count of the 1927 migration. The work was completed this year as intended and the operations of counting conducted with the greatest of satisfaction, no defects whatever in the layout being revealed. All of the yearling salmon which passed out of Cultus lake during the spring, were counted without difficulty and the fence has proved itself to be eminently suitable for the purpose for which it was designed. The final cost of this work was slightly under \$3,000.

#### WATER SUPPLY, DEPARTURE BAY, V.I.

The water supply for the Biological Station at Departure bay is procured from the seepage in the neighbouring high ground, which is collected in a storage tank and delivered to the various surfaces by gravity. The storage tank constructed of wooden plank was erected some years ago. This year, on account of its decayed condition, renewal became necessary. In its place a new concrete tank measuring 10 x 10 x 6 ft. with 6-inch walls was constructed and the old tank dispensed with.

New ditches were dug for the purpose of collecting the water and leading it into the tank. These ditches are from three to five feet in depth and are provided with open boxes of 2 x 12 cedar plank laid in the bottom and carefully

covered in. The water supply at this station is more or less precarious, depending as it does, entirely upon the possibility of collecting water from seepage. It is hoped during the coming year to make surveys for the purpose of obtaining data for a more permanent supply from a small lake some distance back in the hills.

#### BIOLOGICAL STATION, PRINCE RUPERT

A commencement was made on the Biological station at Prince Rupert early in the month of August last and the work was carried on successfully to completion in November. The building is of frame construction throughout and measures 60 x 37 feet. The Provincial Government furnished the site and contributed the sum of \$5,000 towards the construction, plans and specifications being prepared jointly by this Department and the Department of Public Works of the Provincial Government. The very latest and most up-to-date procedure was adopted in designing this building, the suggestions of Mr. Finn, of the Biological Board, being largely embodied in the design. The building is constructed on the dock of the Provincial Government wharf in Prince Rupert harbour, that portion directly under the building having been reconstructed for the purpose by the Provincial Government. The ground floor of the building, which is covered with a slab of concrete, contains furnace room and is provided with proper facilities, whereby experiments in fish processing along commercial lines may be carried out. The second floor contains two laboratories, one biological and the other bio-chemical, fitted with porcelain sinks, hot and cold water, services to each, compressed air, gas and power and fully equipped with drawers, cupboard, tables, work benches, fume cupboards, etc. There is also a director's office, library, a stenographer's office, dark room, constant temperature room and balance room. The upper floor is finished for storage purposes and each floor has direct access with the main floor, a cantilever being provided in the ridge for the purpose of lifting heavy materials by tackle from the wharf below. The building is hot water heated throughout and fully provided with all necessary services. It was constructed under contract by Messrs. Mitchell and Currie, contractors at Prince Rupert, at a total cost of \$14,926.99.

A counting fence which was constructed and operated for the season at a total cost of \$1,879 was erected under the supervision of this branch on Eagle river, Shuswap district, about two miles west of Taft. This fence, which was erected for the purpose of counting the numbers of adult sockeye which it was expected would return, as a result of egg planting operations four years previous, was at first constructed of heavy fox wire set into wooden frames in sections and fastened to heavy posts driven into the stream bed. The fence was approximately 250 feet in length, consisting of two wings converging to a trap of standard size and shape, placed securely in the deepest portion of the river channel. Considerable difficulty was experienced maintaining this fence. Unprecedented fall freshets carrying large quantities of drift material washed out portions of the structure which had to be replaced from time to time by sections of picket fence and the continuation of the high water conditions meant continual maintenance to repair breaks as they occurred. The counting operations were, however, conducted satisfactorily. In the light of the experience gained at Eagle river during the year, it is recommended that any counting fences which may be erected in the future shall be provided with foundations somewhat similar to that of the Cultus lake counting fence, thereby eliminating the danger of underscour. This addition will materially increase costs, but will give more efficient results.

In addition to the foregoing, considerable office work has been performed, many plans prepared and additions from time to time to the large scale maps on which are recorded as received such new geographical and fisheries information as furnished by outside offices.

## APPENDIX No. 5

## FISHERIES

## FINANCIAL STATEMENT, 1926-27

Vote No.	Service	Appropriation	Expenditure
		\$ cts.	\$ cts.
240 and 468	Salaries and Disbursements, F.O.....	829,000 00	819,445 97
	Fisheries Patrol Service.....		
	Fisheries Protection Service.....		
241	Building fishways, etc.....	20,000 00	6,401 20
242	Legal and incidental expense.....	2,000 00	895 69
243 and 469	Conservation and development of deep sea fisheries.....	130,000 00	5,920 39
244	Fisheries Intelligence Bureau.....	2,000 00	539 32
245	Inspection of canned and pickled fish.....	26,000 00	25,356 97
246	Fish culture.....	290,000 00	257,645 44
247	International Halibut Commission.....	31,700 00	32,205 80
248 and 470	Marine Biological Board.....	129,000 00	129,000 00
		1,459,700 00	1,277,410 78
17	Civil Government salaries.....	98,460 00	95,989 29
17	Contingencies.....	20,000 00	18,897 78
Stationery	Fishing bounty.....	160,000 00	159,768 10
		1,738,160 00	1,552,065 95
	Gratuities.....		260 00
	Superannuation Fund No. 5 (Act, 1924).....		19 20
			1,552,345 15





## SUMMARY

Provinces	Inspectors, Overseers and Wardens				Allowances				Gasoline and Oil	Special Guardians		Sundry	Total							
	Salaries		Disb.	Auto		Boat		Horse		Wages	Expenses									
	\$	cts.		\$	cts.	\$	cts.							\$	cts.					
Nova Scotia.....	65,072	78	14,046	78	11,086	01	1,100	00	300	00	382	75	25,912	85	660	97	949	46	119,511	60
Prince Edward Island.....	11,955	00	2,623	82	1,600	00	284	37	.....	.....	254	47	1,401	00	10	75	358	59	18,488	00
New Brunswick.....	38,678	06	5,522	43	6,616	13	1,759	07	300	00	1,005	57	17,315	77	131	82	382	65	71,711	50
Quebec.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Manitoba.....	9,510	00	3,773	26	.....	.....	300	00	656	25	.....	.....	894	60	1,389	50	95	35	16,618	96
Saskatchewan.....	10,939	52	4,300	25	225	00	225	00	1,000	00	.....	.....	645	00	1,184	72	69	17	18,588	66
Alberta.....	10,629	99	5,163	13	300	00	325	00	600	00	.....	.....	2,311	50	1,851	65	210	46	21,391	73
British Columbia.....	57,101	69	23,388	99	164	40	.....	.....	.....	.....	.....	.....	18,828	08	7,430	38	8,105	68	115,019	22
General Account.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11,817	36	11,817	36
	203,887	04	58,818	66	19,991	54	3,993	44	2,856	25	1,642	79	67,308	80	12,659	79	22,111	84	393,270	15

EXPENDITURE, 1926-1927  
DETAILED STATEMENT OF FISHERIES PATROL SERVICE

Establishments and Accounts	Paylist \$ cts	Board or Prov'n. \$ cts	Fuel \$ cts	Repairs		Supplies		Clothing \$ cts.	Sundry \$ cts.	— \$ cts.	Total \$ cts.
				Hull \$ cts.	Engine \$ cts.	Deck \$ cts.	Stewards \$ cts.				
<i>Nona Scotia</i> —											
“Mildred McColl”	3,779 57		646 40	143 83	184 64	124 09	86 54	15 54	250 67	10,396 13	
“F.P. No. 1”	2,318 72	0 72	256 96	282 74	55 56	74 16	23 92	22 10	57 89	3,243 97	
“Grace” (chartered boat)	446 61		122 89			2 50	2 85		921 62	1,507 85	
	6,544 90	0 72	1,026 25	426 57	240 20	200 75	113 31	37 64	1,230 18		15,147 95
<i>Prince Edward Island</i> —											
“Bucky” (chartered boats)	606 46								215 00	821 46	
“Duck”	909 68								550 00	1,459 68	
“Fraser”	606 46								215 00	821 46	
“Hubbard”	909 69								550 00	1,459 69	
“Skerry”	558 07								215 00	773 07	
“Snowbird”	200 00								100 00	300 00	
“Ostrea”				14 75		27 00				41 75	
“Richmond”	1,160 66		193 93	106 32	17 21	3 67	4 97		63 25	1,877 26	
	4,951 02		193 93	121 07	17 21	30 67	4 97		1,908 25		7,554 37
<i>New Brunswick</i> —											
“Phalarope”	4,380 00		1,371 91	65 36	248 08	49 28	130 17	9 82		6,417 75	
“Shannon” (chartered boat)	2,580 00		587 70						657 26	3,842 21	
	6,960 00		1,959 61	65 36	248 08	49 28	130 17	9 82	657 26		10,259 90
<i>Maritoba</i> —											
“Bradbury”	10,008 91	2,458 41	5,494 78	223 50	1,312 55	653 20	227 91	656 46	289 92		21,775 71
<i>British Columbia</i> —											
General Account	3,204 06		142 41	876 90	511 53	151 08	11 79		618 13		5,661 63
Poplar Island Warehouse	1,140 00		20 75	155 56	63 27	2 75		11 56	335 50		1,849 52
<i>Chartered Boats</i> —											
“Alberta”			18 70						31 00	57 35	
“Amy S.”	825 00		214 14						1,008 00	2,097 88	
“Ban Box”	287 10		64 45						89 00	455 25	
“Bergquist”	287 10		39 09						84 00	417 69	
“Betty”	100 00		8 40						31 00	140 90	
“Colby”	1,180 65		229 24			9 07	2 48	9 20	1,054 65	2,541 22	

"Curlew"	261 61	24 18	3 50	80 00	369 29
"Deborah"	96 45	25 32	12 57	130 00	264 34
"Dorothy N."	1,200 00	180 93	29 96	465 40	1,876 28
"Dory"	130 00	2 30		41 00	173 30
"Dot"	77 42				77 42
"Dunno"	283 87	71 60	20 50	88 50	466 47
"Eefoba"	492 52	201 64	39 30	786 00	1,522 87
"Elida"	1,023 14	285 45	65 20	1,112 00	2,488 91
"Elk"	340 54	49 94	5 72	105 00	502 75
"Elkhart"	380 00	64 35	20 49	187 05	651 89
"Esperanza"	1,048 39	408 70	95 10	527 00	2,081 44
"Flying Spur"	907 84	300 18	66 87	744 00	2,027 01
"Gertie W."	720 16	289 73	44 43	891 00	1,947 82
"Goodall"	520 00	80 43	8 25	159 00	767 08
"Grizzly"	711 01	53 31	9 56	626 15	1,401 65
"Haslam"	334 19	27 49	28 55	212 75	602 98
"Hulbert"		4 60	0 75		5 35
"Hummingbird"			2 97		2 97
"Iona"	400 00	94 85	22 19	123 00	640 04
"Ironside"	593 55	110 70	5 00	184 00	893 25
"Isobel W."	270 97	36 22	5 00	84 50	400 69
"Jean"	130 00	17 29	1 50	41 00	189 79
"Kiki"	834 67	169 93	104 18	1,120 20	2,292 10
"Limit"	232 36	19 20	2 54	71 50	326 08
"Lively"	393 55	46 20	17 12	128 13	585 00
"Lola"	193 34	31 86	8 53	59 00	292 72
"Marnel"		144 80	10 03	245 00	1,164 69
"Mary"	753 33	50 72		285 05	335 77
"Megan"		12 01	1 95		13 96
"Melrose"	711 30	134 41	59 28	485 00	1,393 76
"M. E. Smith"	950 00	148 07	30 22	706 15	1,834 44
"Myfawny"	815 33	152 99	50 50	1,110 00	2,159 94
"Nancy"	368 62			315 00	683 62
"Nellie"	638 71	65 92	7 75	198 85	911 23
"Nerets"	445 64	210 27	13 55	366 00	1,021 91
"Odessa"	919 71	193 04	57 75	933 70	2,060 00
"Oh Boy"	795 00	474 60		1,080 00	2,412 11
"Olive"	503 33	70 20	13 61	157 50	744 90
"Omur K."		86 65	82 63	450 00	1,280 37
"Oyaskimo"	1,175 81	175 31	20 21	1,200 67	2,575 81
"Pearl F."	61 51	16 90	7 77	28 50	114 68
"Pontiac"	1,067 75	109 25	12 00	315 00	1,504 09
"Reliance"	1,455 00	53 62	27 82	1,393 60	2,939 15
"R. K."	140 00	17 55	1 96	44 00	205 11
"Robertson"	74 84	22 76	2 84	23 00	123 44
"Rockanroy"		11 52	3 45	39 19	54 16
"Rose"	256 16	48 00	9 65	78 00	391 81
"S. and E."	463 33	20 70	8 65	278 50	771 18

EXPENDITURE, 1926-1927—Continued  
DETAILED STATEMENT OF FISHERIES PATROL SERVICE—Concluded

Establishments and Accounts	Paylist	Board or Prov'n.	Fuel	Repairs		Supplies		Clothing	Sundry	—		Total
				Hull	Engine	Engine	Deck	Stewards				
	\$	cts	\$	\$	cts	\$	\$	\$	\$	cts	\$	\$
"Scallop"	102 83		74 45			14 14			98 00	289 42		
"Sea Bee"	932 58		321 53			69 62			992 00	2,315 73		
"Sea Dog"	520 00		23 75			5 03		1 56	160 00	710 34		
"Seafam"	727 50		115 61			26 17			792 00	1,661 28		
"Sea Snipe"	455 81		229 25			56 82		1 62	416 50	1,160 00		
"Sisters"	156 67		14 40			2 38		1 56	49 00	224 01		
"Skylark"	443 33		174 47			45 60			138 00	801 40		
"Sophamie"	798 84		211 07			27 69		1 62	707 60	1,746 82		
"Speedwell"	520 00		19 90			5 53			157 00	702 43		
"S. Queen"	173 87		16 20			17 80			53 00	260 87		
"Stubbs"	496 67		111 50			33 75			154 35	796 27		
"Vera S. Fry"	810 33		401 26			55 97		3 12	1,111 50	2,382 18		
"Votomac"	146 67		6 25			7 32			46 00	206 24		
"Wabash"	898 07		934 64			148 35		6 52	1,220 00	3,207 58		
"Wakesia"	984 43		208 41		53 84	56 49		3 12	1,072 00	2,378 29		
"Wonder No. 2"	153 33		42 87			16 89			47 50	260 59		
"Wonder No. 3"	153 33		31 40			5 50			47 50	237 73		72,597 61
<i>Departmental Boats—</i>												
"Annie"												
"Babine No. 1"	700 00		68 03	5 80	40 16	29 07	9 25	24 82	7 50	7 50		
"Babine No. 2"	700 00		67 28	6 05	44 63		4 00		85 15	962 28		
"Black Raven"	1,454 17		478 10	77 68	236 61	398 64	89 90	155 12	96 85	918 81		
"Bonilla Rock"	2,555 00		740 57	188 50	30 86	207 95	55 30	141 61	114 63	3,013 09		
"Cloyah"	3,231 00		666 58	24 75	118 34	274 96	124 74	46 72	6 60	3,936 01		
"Cohoe Bay"	1,072 58		25 82	80 16	118 09	40 58	40 17	10 37	47 96	4,439 43		
"Egret Plume"	3,420 00		323 45	198 05	122 83	53 05	54 73	75 81	46 01	2,082 96		
"Elk Horn"	3,500 00		420 66	14 60	55 28	35 00	13 00	24 14	95 45	2,423 37		
"Fogam Crest"	4,476 77		513 40	4 35	63 46	14 75	9 15	34 03	11 02	3,997 58		
"Gull Wing"	1,500 00		159 44	32 84	238 87	239 12	27 06	59 37	34 01	5,175 02		
"Hawkeye"	1,372 84		307 71	110 80	28 29	80 72	5 60	7 62	72 48	2,341 89		
"Heron Wing"	1,836 07		563 50	113 05	422 46	140 63	29 20	149 44	6 40	1,924 36		
"Linnett N."	1,357 10		424 84	153 85	13 14	136 26	54 20	20 03	32 19	3,295 42		
"Marfish"	5,610 33	1,386 14	1,741 18	3,259 17	88 12	551 19	218 95	198 53	12 85	2,171 94		
"Merlin B."	1,294 93	0 33	364 93	90 75	7 34	145 04	11 14	22 28	104 15	13,449 90		
"Merrysea"	4,500 00	111 30	150 43	56 29	235 40	233 95	20 63	89 96	1,946 36	5,603 93		
"Metro"	60 97	24 96	24 40	102 28	9 10	0 20		5 11	202 21	5,603 93		
"Revidis"	2,837 50	336 63	330 36	159 10	531 49	365 03	79 05	117 22	90 95	317 97		
"Salmo"	950 96		99 56	8 25	75 10	10 65	6 60	14 06	35 21	4,791 59		
"Swan Tail"	4,500 00		621 11	34 55	119 99	15 95	11 43	34 20	119 40	1,284 58		
"Vanadis"	6,476 61	1,451 85	493 26	117 82	1,061 17	663 46	190 29	319 30	18 77	203 84		
"Vedder River"	3,420 00		320 90	4 10	18 52	2 18	41 55	24 93	10 41	11,069 77		
	94,156 44	3,311 21	18,018 70	5,820 91	4,269 96	5,703 09	1,287 25	1,701 70	29,862 95	84,388 01		164,496 77

## SUMMARY

Nova Scotia.....	6,544 90	0 72	1,026 25	426 57	240 20	5,327 43	200 75	113 31	37 64	1,230 18	15,147 95
Prince Edward Island.....	4,951 02		193 93	121 07	17 21	327 25	30 67	4 97		1,908 25	7,554 37
New Brunswick.....	6,960 00		1,959 61	65 36	248 08	180 38	49 28	130 17	9 82	1,657 26	10,259 96
Manitoba.....	10,008 91	2,458 41	5,494 78	223 50	1,312 55	450 07	653 20	227 91	656 46	289 92	21,775 71
British Columbia.....	94,156 44	3,311 21	18,018 70	5,820 91	4,269 96	5,703 09	1,287 25	1,701 70	364 56	29,862 95	164,496 77
	122,621 27	5,770 34	26,693 27	6,657 41	6,088 00	11,988 22	2,221 15	2,178 06	1,068 48	33,948 56	219,234 76

EXPENDITURE, 1926-27  
DETAILED STATEMENT OF FISHERIES' PROTECTION SERVICE

Establishments and Accounts	Paylist \$ cts.	Board or Prov'n. \$ cts.	Fuel \$ cts.	Repairs		Supplies			Clothing \$ cts.	Sundry \$ cts.	— \$ cts.	Total \$ cts.
				Hull \$ cts.	Engine \$ cts.	Engine \$ cts.	Deck \$ cts.	Stewards \$ cts.				
General Account.....										104 00		104 00
East Coast—												
Arleux.....	20,201 55	5,365 79	8,058 99	5,268 51	971 87	614 07	1,420 53	501 00	1,327 14	1,033 83	44,763 28	
Arras.....	21,380 01	5,997 01	8,723 54	4,483 40	2,958 84	2,094 69	691 00	435 80	1,186 96	1,780 56	49,731 81	
	41,581 56	11,362 80	16,782 53	9,751 91	3,930 71	2,708 76	2,111 53	936 80	2,514 10	2,814 39		94,495 09
West Coast—												
Givenchy.....	25,089 78	7,120 24	9,829 70	2,521 26	2,697 30	996 47	669 23	812 14	1,520 49	1,046 46	52,303 07	
Malaspina.....	29,780 11	7,959 08	12,470 98	2,350 47	1,889 39	674 69	1,024 84	808 52	1,724 89	1,355 93	60,038 90	
	54,869 89	15,079 32	22,300 68	4,871 73	4,586 69	1,671 16	1,694 07	1,620 66	3,245 38	2,402 39		112,341 97

## SUMMARY

General Account.....										104 00	104 00
East Coast.....	41,581 56	11,362 80	16,782 53	9,751 91	3,930 71	2,708 76	2,111 53	936 80	2,514 10	2,814 39	94,495 09
West Coast.....	54,869 89	15,079 32	22,300 68	4,871 73	4,586 69	1,671 16	1,694 07	1,620 66	3,245 38	2,402 39	112,341 97
	96,451 45	26,442 12	39,083 21	14,623 64	8,517 40	4,379 92	3,805 60	2,557 46	5,759 48	5,320 78	206,941 06

## DETAILED STATEMENT OF FISH CULTURE EXPENDITURE, 1926-1927

Hatcheries	Salaries	Maintenance	Total of Hatchery	Total of Provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Nova Scotia</i> .....				29,869 84
Bedford.....	1,440 00	5,012 75	6,452 75	
Halifax Summer School.....		1,171 03	1,171 03	
Lindloff.....	273 00	738 53	1,011 53	
Margaree.....	4,140 00	4,034 12	8,174 12	
Margaree Pond.....	176 00	2,225 25	2,401 25	
Middleton.....	1,560 00	4,322 93	5,882 93	
Windsor.....	1,500 00	3,276 23	4,776 23	
<i>Prince Edward Island</i> .....				4,533 27
Kelly's Pond Hy.....	2,820 00	1,713 27	4,533 27	
<i>New Brunswick</i> .....				48,245 23
Grand Falls.....	2,940 00	3,000 05	5,940 05	
Miramichi.....	3,120 00	3,728 06	6,848 06	
Miramichi Pond.....		2,403 45	2,403 45	
Nepisiquit.....	588 90	846 44	1,435 34	
New Hatchery on St. John River.....		8 88	8 88	
New Mills Pond.....	727 26	3,436 94	4,164 20	
Restigouche.....	2,258 84	2,483 76	4,742 60	
Sparkle.....	627 91	130 73	758 64	
St. Andrews Summer School.....		371 08	371 08	
St. John.....	2,820 00	7,790 21	10,610 21	
St. John Pond.....		10,740 38	10,740 38	
Tobique.....		222 34	222 34	
<i>Ontario</i> .....				19,894 97
Collingwood.....	780 00	2,432 85	3,212 85	
Kenora.....	780 00	2,629 59	3,409 59	
Kingsville.....	1,140 00	951 82	2,091 82	
Port Arthur.....	735 00	782 13	1,517 13	
Sarnia.....	1,005 00	1,635 40	2,640 40	
Southampton.....	750 00	439 90	1,189 90	
Thurlow.....	1,500 00	1,381 43	2,881 43	
Warton.....	1,080 00	1,871 85	2,951 85	
<i>Manitoba</i> .....				19,924 81
Dauphin River.....		216 00	216 00	
Dauphin River Spawn Camp.....		1,274 76	1,274 76	
Gull Harbour.....	1,680 00	5,528 07	7,208 07	
Winnipegosis.....	1,960 00	9,265 98	11,225 98	
<i>Saskatchewan</i> .....				6,878 44
Qu'Appelle.....	2,940 00	3,938 44	6,878 44	
<i>Alberta</i> .....				8,345 03
Banff.....	3,075 00	3,821 87	6,896 87	
Spray Lakes.....		1,448 16	1,448 16	
<i>British Columbia</i> .....				108,987 77
General.....	7,543 71	3,203 11	10,746 82	
" (Eagle River Counting Fence).....	153 00	1,699 42	1,852 42	
Anderson.....	2,182 91	4,533 45	6,716 36	
Babine.....	2,526 79	5,586 74	8,113 53	
Cowichan.....	3,389 75	3,858 55	7,248 30	
Cranbrook Eyeing Station.....	299 51	548 95	848 46	
Cultus.....	927 74	4,502 68	5,430 42	
Gerrard.....	90 00	1,527 75	1,617 75	
Harrison.....	321 94	143 42	465 36	
Kennedy.....	2,028 44	5,232 28	7,260 72	
Lloyds Creek Eyeing Station.....	412 50	1,445 73	1,858 23	
Nelson Eyeing Station.....	2,123 54	3,601 32	5,724 86	
Pemberton.....	5,145 44	6,881 95	12,027 39	
Pitt.....	1,211 62	4,663 75	5,875 37	
Rivers Inlet.....	2,522 55	9,960 71	12,483 26	
Skeena.....	3,034 78	12,595 38	15,630 16	
Stuart.....	1,440 00	3,648 36	5,088 36	
<i>General Account</i> .....	5,820 00	5,146 08	10,966 08	10,966 08
	83,591 13	174,054 31		257,645 44

## SUMMARY

Nova Scotia.....	9,089 00	20,780 84	29,869 84
Prince Edward Island.....	2,820 00	1,713 27	4,533 27
New Brunswick.....	13,082 91	35,162 32	48,245 23
Ontario.....	7,770 00	12,124 97	19,894 97
Manitoba.....	3,640 00	16,284 81	19,924 81
Saskatchewan.....	2,940 00	3,938 44	6,878 44
Alberta.....	3,075 00	5,270 03	8,345 03
British Columbia.....	35,354 22	73,633 55	108,987 77
General Account.....	5,820 00	5,146 08	10,966 08
	83,591 13	174,054 31	257,645 44

# FISHERIES BRANCH

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## FISHERIES EXPENDITURE, 1926-27—SUMMARY BY PROVINCES

Appropriation	General	Nova Scotia	Prince Edward	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Totals
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Salaries and disbursements.....	11,817 36	119,511 60	18,488 00	71,711 50	123 12		16,618 96	18,588 66	21,391 73	115,019 22	393,270 15
Fisheries Petrol.....		15,147 95	7,554 37	10,259 96			21,775 71			164,496 77	219,234 76
Fisheries Protection.....	13,757 23	79,288 17	342 05	1,211 64						112,341 97	206,941 06
Fish Culture.....	10,966 08	29,869 84	4,533 27	48,245 23		19,894 97	19,924 81	6,878 44	8,345 03	108,987 77	257,645 44
Building Fishways, etc.	32 06	1,296 68		557 77			1 56	1 77		4,511 36	6,401 20
Conservation and development, etc.....											
Fisheries Intelligence Bureau.....	1,603 83	2,634 93	985 85							695 78	5,920 39
Inspection of canned and pickled fish.....	327 39	22 00	75 93	114 00							539 32
International Halibut Commission.....	81 99	18,320 27		2,106 43	647 95					4,200 33	25,356 97
Legal and Incidental Expenses.....		190 00	105 00	206 79			58 55			335 35	895 69
Marine Biological Bd.	129,000 00		13,221 55	16,721 00	46,818 65						129,000 00
Fishing Bounty.....		83,006 90									159,768 10
	167,565 94	349,288 34	45,306 02	151,134 32	47,589 72	19,894 97	58,379 59	25,468 87	29,736 76	542,794 35	1,437,178 88
Civil Government Salaries.....											95,969 29
Contingencies.....											18,897 78
Gratuities.....											1,552,065 95
Sup. Fund, No. 5.....											260 00
											19 20
											1,552,345 15

## APPENDIX No. 6

LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1926

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed
					cwt.
Adeline.....	6	2	1	Sell fish.....	20
Akutan.....	46	10	11	Sell fish, water.....	4,140
Alaska.....	57	15	7	Sell fish.....	2,400
Albatross.....	40	13	8	Sell fish, bait supplies.....	1,180
Aisance.....	11	5	1	Supplies.....	
Alice.....	21	3	2	Shelter.....	
Alice B.....	17	5	7	Supplies.....	
Alki.....	7	3	10	Sell fish.....	640
Aloha.....	19	6	8	Supplies.....	
Alsha.....	19	6	2	Bait.....	
Alten.....	43	15	11	Sell fish.....	4,540
America.....	25	11	4	Bait, supplies.....	
Anna J.....	22	6	8	Sell fish.....	940
Antler.....	22	5	9	Bait, supplies, sell fish.....	81
Arcade.....	14	4	7	Supplies.....	
Artic.....	29	7	4	Sell fish.....	1,120
Argo.....	26	6	4	Water, supplies.....	
Arrow.....	40	9	9	Sell fish.....	2,700
Atlantic.....	25	9	10	".....	2,900
Atlas.....	31	7	10	".....	3,080
Attie.....	37	10	9	".....	2,800
Augusta.....	19	5	8	".....	1,080
Ayohba.....	5	2	1	Supplies.....	
Baltic.....	20	5	3	Sell fish.....	420
Beaver.....	17	6	10	Supplies.....	
Bertha.....	11	3	5	Engine repairs, supplies.....	
Betty.....	15	5	7	Sell fish.....	740
Blanco.....	24	6	10	"....., orders.....	680
Bonanza.....	30	6	6	".....	1,220
Bravo.....	14	3	4	".....	300
Brinvold.....	33	7	1	".....	360
Brisk.....	37	9	11	"....., water.....	3,320
Brothers.....	13	5	10	".....	1,400
California.....	20	5	8	Orders, supplies, water.....	
Cape Clear.....	12	5	2	Sell fish.....	160
Carmen.....	19	9	2	".....	320
Carolyn.....	18	5	3	".....	180
Castor.....	18	5	2	Supplies.....	
Cedric.....	19	6	6	Sell fish.....	1,480
Chancellor.....	14	5	6	Supplies, water.....	
Chelsea.....	51	10	10	Sell fish, supplies.....	2,920
Chimera.....	9	4	9	Shelter, bait, supplies.....	
Chum.....	6	3	1	Sell fish.....	60
Clara.....	6	2	1	Supplies.....	
Columbia.....	41	9	9	Sell fish.....	3,320
Commonwealth.....	60	17	3	".....	1,820
Condor.....	4	2	1	".....	140
Constitution.....	39	10	8	Sell fish, water.....	2,460
Corona.....	50	15	4	Supplies, sell, fish.....	240
Curlew.....	18	5	8	Bait, sell fish, supplies.....	54
Daily.....	26	6	4	Sell fish.....	1,260
Defence.....	20	5	2	".....	300
Democrat.....	27	6	8	"....., supplies.....	1,360
Diana.....	22	6	9	Supplies, water.....	
Discovery.....	10	4	9	Engine trouble, sell fish, supplies.....	20
Dixland.....	7	2	1	Shelter.....	
Dora H.....	18	6	1	Supplies.....	
Eagle.....	67	15	16	Sell fish.....	4,720
Eastern Point.....	4	3	15	".....	740
Eidsvold.....	15	5	8	Supplies.....	
Eleanora.....	15	5	1	".....	
Ellen.....	5	2	1	".....	
Emblem.....	4	3	1	Sell fish.....	40
E. Neilson.....	15	4	5	".....	420
Enterprise.....	8	3	10	Bait, supplies.....	

List of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1926—Continued

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed
					cwt.
Eureka.....	11	3	13	Sell fish.....	1,100
Evolution.....	17	5	3	Supplies.....	
Explorer.....	34	9	2	Sell fish.....	560
Fairway.....	19	5	10	" , supplies.....	580
Faith.....	7	3	10	Supplies.....	
F. C. Hergert.....	21	5	5	Bait, supplies.....	
Far West.....	37	4	1	Supplies.....	
Flamingo.....	13	5	5	".....	
Flattery.....	10	3	3	Sell fish.....	200
Foremost.....	66	15	8	".....	3,820
Fortuna.....	21	5	9	Bait, shelter, supplies.....	
Forward.....	18	5	13	Sell fish, supplies.....	540
Fremont.....	10	4	6	Supplies.....	
Glacier.....	13	4	9	Sell fish.....	1,000
Gladstone.....	23	6	2	".....	320
Gladys.....	11	4	4	".....	320
Gony.....	12	5	6	Supplies, sell fish.....	140
Grant.....	43	9	9	Sell fish.....	2,460
Grayling.....	16	5	6	".....	800
Gretchen.....	7	4	15	Bait, shelter, supplies.....	
Harding.....	19	5	5	Supplies.....	
Harold.....	21	2	1	Shelter.....	
Hattie B.....	6	5	1	Supplies.....	
Happy.....	12	4	5	Sell fish.....	600
Havana.....	41	15	6	Supplies, sell fish.....	1,280
Hazel H.....	24	5	8	Sell fish.....	1,100
Helgeland.....	56	15	9	".....	3,680
Hi Gill.....	12	4	1	".....	80
Hilda.....	10	3	4	".....	360
Imperial.....	23	6	5	".....	640
Ithona.....	20	6	11	".....	2,260
Ivanhoe.....	27	6	7	".....	1,260
Jack.....	9	4	2	".....	320
Jennie F. Decker.....	16	5	3	Supplies.....	
J. P. Todd II.....	12	4	7	Sell fish.....	680
Joy W.....	7	2	1	Shelter.....	
June.....	15	5	4	Sell fish.....	440
K. 24.....	5	2	1	Supplies.....	
K. 95.....	5	2	1	".....	
K. 500.....	5	1	1	".....	
Kanaga.....	47	9	11	Sell fish.....	3,920
Kanatak.....	39	9	9	Supplies, sell fish.....	1,260
Katalla.....	16	5	5	Sell fish, supplies.....	40
Kate.....	3	2	1	Water.....	
Kodiak.....	38	15	10	Supplies, sell fish.....	1,540
L. 427.....	7	2	1	Engine trouble.....	
Lancing.....	16	5	4	Sell fish.....	640
La Paloma.....	14	11	9	Supplies.....	
Lenor.....	14	5	3	Sell fish.....	300
Leviathan.....	29	6	4	".....	700
Lewis.....	5	5	1	Supplies.....	
Libanon.....	14	5	6	".....	
Liberty.....	44	15	6	Sell fish, supplies.....	940
Lincoln.....	23	6	7	".....	1,220
Lituya.....	30	7	9	".....	1,960
Lois.....	15	7	1	Engine trouble.....	
Loma.....	28	7	1	Supplies.....	
Louise.....	16	8	13	".....	
Loveras.....	3	2	2	".....	
Lummen.....	10	3	3	Sell fish.....	340
M. 1023.....	5	2	1	Shelter.....	80
Madeline J.....	25	6	6	Supplies, sell fish.....	
Maggie.....	4	1	1	In distress.....	
Majestic.....	33	7	9	Sell fish.....	2,880
Mariner.....	21	5	9	Bait, supplies.....	
Marmot.....	30	9	8	Sell fish.....	2,420
Mars.....	9	4	3	".....	340
Mary.....	16	8	15	Bait, supplies.....	
Mermaid.....	19	5	9	Sell fish, supplies.....	100
Middleton.....	24	5	7	".....	1,020

LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1926—Continued

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed cwt.
Mildred II.....	31	6	3	Sell fish.....	880
Mira.....	7	1	1	Water.....	
Myrtle.....	9	4	8	" , supplies.....	
National.....	20	6	9	Sell fish, supplies.....	820
Neptune.....	43	13	4	Supplies, sell fish.....	260
New England.....	70	19	2	Repairs, sell fish.....	1,100
Nomad.....	22	5	4	Supplies.....	
Nordenskjold.....	39	13	2		
Nordic.....	30	7	7	Sell fish.....	1,480
North.....	9	3	16	Supplies, sell fish.....	1,440
Oceanus.....	26	6	10	"	
Omaney.....	34	13	6	Sell fish.....	1,980
Omah.....	18	5	19	"	1,840
Orient.....	48	14	6	" sickness.....	220
Osprey.....	16	5	1	Supplies.....	
Ouinait.....	61	13	1		
Pacific.....	17	3	1	Supplies.....	
Panama.....	35	13	7	" sell fish.....	1,340
Paragon.....	69	15	9	" ".....	3,720
Pearl.....	5	2	1	"	
Pershing.....	18	5	9	"	
Pioneer.....	48	9	6	Sell fish.....	1,980
Pioneer III.....	26	5	5	Supplies, bait.....	
Polaris.....	45	15	5	Sell fish.....	1,600
Portlock.....	36	9	5	"	1,820
Premier.....	10	2	1	Defective clutch.....	
Presho.....	14	5	17	Supplies, shelter, bait.....	
President.....	24	6	7	Sell fish.....	1,780
Prosperity.....	25	6	6	"	1,180
Radio.....	63	13	11	"	4,960
Ranier.....	39	9	13	"	4,000
Reliance I.....	19	5	3	"	360
Reliance II.....	25	5	1	"	100
Reliance.....	14	4	4	"	480
Reliance.....	8	3	7	"	450
Republic.....	51	15	6	" supplies.....	2,440
Resolute.....	47	10	11	"	4,580
Restitution.....	24	6	6	Supplies.....	
Road Amundsen.....	22	6	3	Sell fish.....	450
Rosario.....	16	5	2	Supplies.....	
Royal.....	15	5	10	Sell fish, supplies.....	20
Royal.....	2	1	2	"	40
Roosevelt.....	13	5	6	Supplies.....	
Rutat.....	50	15	4		
Sadie K.....	16	4	1	Sell fish.....	80
Saming.....	8	2	1	Shelter.....	
Scandia.....	79	17	9	Supplies, sell fish.....	2,040
Sea-Bird.....	5	2	1	"	
Seasnort.....	4	2	1	"	
Seattle.....	55	15	10	" sell fish.....	4,600
Selma J.....	9	4	2		
Senator.....	11	7	6	Sell fish.....	1,820
Sentinel.....	21	6	8	"	1,760
Seymour.....	44	13	6	Engine trouble, sell fish.....	1,000
Shelano.....	26	5	2	Supplies.....	
Sherman.....	10	5	8	Sell fish.....	1,340
Sirius.....	17	4	2	"	240
Sitka.....	50	10	7	"	2,380
Solano.....	52	11	2	Supplies.....	
Spray.....	20	6	8	" sell fish.....	1,200
Star.....	12	4	6	Sell fish.....	660
Summer.....	34	5	10	"	3,700
Sunset.....	37	9	9	"	3,040
Sun Wing.....	15	4	1	"	120
Superior.....	26	6	3	"	580
Superior.....	16	5	5	Supplies.....	
Susan.....	5	1	2	Shelter.....	
Swan.....	9	4	6	Supplies, shelter.....	
T 999.....	5	1	1	Supplies.....	
Tooosh.....	23	6	7	Sell fish.....	1,700

LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1926—*Concluded*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed
					cwt.
Teddy J.....	13	5	3	Sell fish.....	480
Tenyslar.....	13	2	1	Supplies.....	
Texas.....	16	5	8	".....	
Thelma II.....	26	5	5	Sell fish, supplies.....	140
Thor.....	25	10	6	".....	1,920
Tillicum.....	21	5	1	Shelter.....	
Todd.....	12	5	1	Supplies.....	
Trinity.....	41	9	9	Sell fish.....	3,480
Tordenskjold.....	39	13	3	Supplies.....	
Twilight.....	8	2	1	".....	
Tyee.....	13	4	5	Sell fish.....	560
Uncle Jim.....	6	2	1	Bait.....	
Unimak.....	22	5	10	" supplies, sell fish.....	60
Urania.....	27	6	3	Sell fish.....	800
Uranus.....	15	5	10	Supplies, sell fish.....	180
Valero.....	6	3	3	".....	
Valor.....	9	3	1	".....	
Valorous.....	21	6	11	Sell fish.....	1,820
Vansee.....	58	13	7	".....	2,940
Veleno.....	6	2	1	Supplies.....	
Velva.....	6	3	3	".....	
Venus.....	25	7	9	Sell fish.....	2,500
Venus.....	4	3	4	".....	260
Viking.....	20	5	1	Supplies.....	
Viking.....	11	4	8	".....	
Virginia.....	33	6	5	Sell fish.....	1,020
Virginius.....	5	2	1	Supplies.....	
Volunteer.....	20	7	4	".....	
Wabash.....	6	3	14	Sell fish.....	800
Wave.....	7	3	12	".....	640
Wesley.....	0	3	0	Supplies.....	
Western.....	41	9	9	Sell fish.....	3,180
Westjord.....	17	5	6	Supplies, sell fish.....	100
White Star.....	17	5	8	".....	
Wilson.....	22	6	5	" ".....	420
Wireless.....	19	5	7	" sickness.....	
Wizard.....	49	8	11	Sell fish.....	3,440
Woodrow.....	23	5	6	Supplies.....	
Wyach.....	2	2	1	Shelter.....	
Yakutat.....	41	12	5	Sell fish, orders.....	1,440
Yaquina.....	29	6	9	" supplies.....	120
Yellowstone.....	22	4	6	".....	800
Yukon.....	31	7	7	".....	1,980
Zenith.....	47	10	7	".....	2,620

## APPENDIX No. 7

The following is a statement of the different kinds of licenses issued by the different inspectors during the 1926-27 season:—

## MAGDALEN ISLANDS, QUEBEC—INSPECTOR S. T. GALLANT

Kind of Licenses—	Number of Licenses Issued
Lobster fishing licenses.....	504
Lobster packing licenses.....	15
Lobster packing extensions—24.	
Certificates under section 63—3.	
Herring seine licenses.....	24
Herring trap-net licenses.....	25 (1 cod trap-net)
Lobster pound licenses.....	1
	<hr/> 569

## PRINCE EDWARD ISLAND—INSPECTOR S. T. GALLANT

Lobster fishing licenses.....	2,200 (2 cancelled)
Lobster packing licenses.....	137
Lobster packing extensions—72.	
Oyster fishery licenses.....	147
Quahaug fishery licenses.....	4
Fish cannery licenses.....	11
Certificates under section 63—6.	
Reduction works licenses.....	Nil
Trap-net fishing licenses.....	3
Smelt gill-net licenses.....	355
Smelt bag-net licenses.....	233
	<hr/> 3,090 (2 cancelled)

## NOVA SCOTIA—DISTRICT No. 1—INSPECTOR A. G. McLEOD

Lobster fishing licenses.....	1,830
Lobster packing licenses.....	47
Lobster packing extensions—52.	
Oyster fishery licenses.....	77
Fish cannery licenses.....	6
Certificates under section 63—63.	
Reduction works licenses.....	1
Herring weir licenses.....	Nil
Trap-net fishing licenses.....	43
Salmon gill-net or drift-net licenses.....	24
Salmon trap-net, pound-net or weir licenses.....	162
Special angling permits.....	57
Smelt gill-net licenses.....	210
Smelt bag-net licenses.....	32
Lobster pound licenses.....	Nil
	<hr/> 2,489

## NOVA SCOTIA—DISTRICT No. 2—INSPECTOR D. H. SUTHERLAND

Lobster fishing licenses.....	2,819 (2 cancelled)
Lobster packing licenses.....	57 (1 cancelled)
Lobster packing extensions—69.	
Oyster fishery licenses.....	112
Quahaug fishery licenses.....	1
Shad gill-net or drift-net licenses.....	22
Fish cannery licenses.....	3
Certificates under section 63—94.	
Reduction works licenses.....	2
Seine licenses.....	157 (1 cancelled)
Herring weir licenses.....	11
Trap-net fishing licenses.....	117
Salmon gill-net or drift-net licenses.....	348 (1 cancelled)
Salmon trap-net, pound-net or weir licenses.....	144
Special angling permits.....	56
Smelt gill-net licenses.....	217
Smelt bag-net licenses.....	228
Scallop fishery licenses.....	Nil
Lobster pound licenses.....	3
Lobster pound certificates—81.	

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4,297 (5 cancelled)

## NOVA SCOTIA—DISTRICT No. 3—INSPECTOR H. H. MARSHALL

Kind of Licenses—Continued	Number of Licenses Issued
Lobster fishing licenses.....	3,110 (1 cancelled)
Lobster packing licenses.....	31
Lobster packing extensions—16.	
Shad gill-net or drift-net licenses.....	3
Fish cannery licenses.....	15
Certificates under section 63—176 (1 cancelled and 1 spoiled).	
Reduction works licenses.....	Nil
Herring weir licenses.....	73 (1 cancelled)
Trap-net fishing licenses.....	140
Salmon gill-net or drift-net licenses.....	225
Salmon trap-net, pound-net or weir licenses.....	61
Salmon net permits.....	32
Special angling permits.....	549 (3 cancelled)
Smelt gill-net licenses.....	85
Smelt bag-net licenses.....	24
Scallop fishery licenses.....	326
Lobster pound licenses.....	11
Lobster pound certificates—243.	
	<hr/> 4,685 (5 cancelled)

## NEW BRUNSWICK—DISTRICT No. 3—INSPECTOR H. E. HARRISON

Shad gill-net or drift-net licenses.....	212
Sturgeon fishery licenses.....	11
Whitefish fishery licenses.....	Nil
Salmon net permits.....	169
Salmon gill-net or drift-net licenses.....	124
Smelt gill-net licenses.....	1
Smelt bag-net licenses.....	Nil
Bass fishery licenses.....	85
	<hr/> 602

## NEW BRUNSWICK—DISTRICT No. 1—INSPECTOR J. F. CALDER

Lobster fishing licenses.....	544
Shad gill-net or drift-net licenses.....	46
Fish cannery licenses.....	7
Certificates under section 63—4.	
Reduction works licenses.....	1
Herring weir licenses.....	581
Clam permits.....	56
Salmon gill-net or drift-net licenses.....	82
Herring seine licenses.....	1
Smelt gill-net licenses.....	Nil
Smelt bag-net licenses.....	Nil
Scallop fishery licenses.....	3
Lobster pound licenses.....	3
Lobster pound certificates—71.	
Lease of dark harbour fishing privileges—1.	
	<hr/> 1,324

## NEW BRUNSWICK—DISTRICT No. 2—INSPECTOR A. L. BARRY

Lobster fishing licenses.....	1,973
Lobster packing licenses.....	130
Lobster packing extensions—48.	
Oyster fishery licenses.....	492
Quahaug fishery licenses.....	57
Shad gill-net or drift-net licenses.....	13
Fish cannery licenses.....	6
Certificates under section 63—205 (1 cancelled).	
Reduction works licenses.....	Nil
Herring weir licenses.....	Nil
Gaspereau pound-net or trap-net licenses.....	46
Salmon gill-net or drift-net licenses.....	53
Salmon trap-net, pound-net or weir licenses.....	491
Smelt gill-net licenses.....	128
Smelt bag-net licenses.....	5,303
Scallop fishery licenses.....	9
Lobster pound licenses.....	6 (1 cancelled)
Bass fishery licenses.....	48
Lobster pound certificates—247.	
	<hr/> 8,755 (1 cancelled)

## MARINE AND FISHERIES

## MANITOBA—INSPECTOR J. B. SKAPTASON

Kind of Licenses— <i>Continued</i>	Number of Licenses Issued
Commercial sturgeon fishery licenses.....	184
Domestic sturgeon fishery licenses.....	98
Special angling permits (non-resident).....	196
Receipt books—79.	
Pound-net licenses .....	16
Special fishery licenses.....	3,465
Settler's permits .....	1,349
	<hr/> 5,308

## SASKATCHEWAN—INSPECTOR G. C. MACDONALD

Commercial sturgeon fishery licenses.....	2	
Domestic sturgeon fishery licenses.....	Nil	
Special angling permits.....	286	
Receipt books—2.		
Commercial and fisherman's fishery licenses.....	328	(5 cancelled)
Domestic fishery licenses.....	129	(2 cancelled)
Indian and half-breed permits.....	841	(1 cancelled and 5 destroyed)
	<hr/> 2,086	(8 cancelled and 5 destroyed)

## ALBERTA—INSPECTOR R. T. RODD

Indian and half-breed permits.....	903	
Commercial and fisherman's licenses.....	1,589	(8 cancelled)
Receipt books—973 (3 cancelled).		
Fish cannery licenses.....	Nil	
Special angling permits.....	5,669	(5 cancelled)
Domestic fishery licenses.....	180	(5 cancelled)
	<hr/> 8,341	(18 cancelled)

## BRITISH COLUMBIA—INSPECTOR J. A. MOTHERWELL

Fish cannery licenses.....	8	
Reduction works licenses.....	23	
Special angling permits.....	36	
Indian permits .....	267	
Metal tags—267.		
Crab fishery licenses.....	133	
Smelt or sardine fishery licenses.....	73	
Sturgeon fishery licenses.....	Nil	
Miscellaneous licenses .....	137	
Salmon fishery licenses.....	4,417	(4 cancelled)
Salmon trolling licenses.....	2,382	(1 cancelled)
Salmon trap-net licenses.....	14	
Salmon purse-seine licenses.....	407	(1 cancelled)
Salmon drag-seine licenses.....	41	
License to Captain of salmon (purse or drag) seine boat.....	277	
Salmon curing licenses.....	61	(2 cancelled)
Salmon cannery licenses.....	79	
Boat license to buy fresh salmon from fishermen.....	266	
License to a person engaged in cold storage or fish packing to buy fresh salmon from fishermen.....	61	
Grayfish fishery licenses.....	177	
Licenses to assistant operator of salmon (purse or drag) seine used under license number.....	1,556	
License to assistant in a boat used in operating a salmon gill- net or drift-net .....	1,035	
Cod fishery licenses.....	400	
Herring or pilchard gill-net or drift-net licenses.....	32	
Herring or pilchard drag-seine licenses.....	Nil	
Herring or pilchard purse-seine licenses.....	64	(1 cancelled)
License to Captain of a herring or pilchard seine boat .....	60	
Herring or pilchard curing licenses.....	30	
Whale factory licenses.....	2	
Counterfoil of pelagic sealing certificates—16.		
	<hr/> 12,038	(9 cancelled)

## YUKON

Special fishery licenses.....	28
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## PACIFIC COAST

Licenses to United States fishing vessels.....	200
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Total .....	53,812	(48 cancelled and 5 destroyed)
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DOMINION OF CANADA

SIXTY-FIRST

ANNUAL REPORT

OF THE

# FISHERIES BRANCH

Department of Marine and Fisheries

FOR THE YEAR

1927-28



OTTAWA  
P. A. ACLAND  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
1928

Price, 40 cents



Canada. Dept. of Fisheries

DOMINION OF CANADA

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Department of Marine and Fisheries

---

FOR THE YEAR

1927-28



OTTAWA  
P. A. ACLAND  
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY  
1928



To His Excellency the Right Honourable Viscount Willingdon, G.C.S.I.,  
G.C.M.G., G.C.I.E., G.B.E., Governor General and Commander in Chief  
of the Dominion of Canada.

MAY IT PLEASE YOUR EXCELLENCY:

I have the honour to submit herewith, for the information of your Excellency and the Parliament of Canada, the Sixty-first Annual Report of the Fisheries Branch of the Department of Marine and Fisheries.

I have the honour to be,

Your Excellency's most obedient servant,

P. J. ARTHUR CARDIN,

*Minister of Marine and Fisheries.*

DEPARTMENT OF MARINE AND FISHERIES,  
Ottawa, July, 1928.

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## DEPUTY MINISTER'S REPORT

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To the Hon. P. J. A. CARDIN,  
Minister of Marine and Fisheries.

SIR,—I have the honour to submit the Sixty-first Annual Report of the Fisheries Branch of the Department, which is for the fiscal year ended March 31, 1928.

The report deals with the following subjects:—

- Review of the Fisheries of 1927.
- Operation of the Fish Inspection Act.
- The Inspection of Canneries and Canned Fish.
- Imperial Economic Committee's Report on Marketing Canadian Fish.
- Fisheries Intelligence Service.
- Fishing Bounty.
- Fish Culture.
- North American Committee on Fisheries Investigation.
- International Fisheries Commission.
- Marine Biological Board.
- Prosecutions.
- Oyster and Scallop Investigations.

Appendices to the report include the following:—

- Report of Inspectors of Fisheries.
- Report on Activities of Marine Biological Board.
- Report on Oyster and Scallop Investigations.
- Report of Fisheries Engineer on Fishways, etc.
- Fisheries Expenditure and Revenue.
- Entries of United States Fishing Vessels.
- Summary of Licenses Issued.
- Return of Prosecutions.
- Expenditure and Revenue by provinces, 1867-1927.
- Report of Mr. J. J. Cowie and Mr. G. R. Earl on their work with Imperial Economic Committee.
- Report on the Fisheries of the McKenzie River Delta.

### REVIEW OF THE FISHERIES OF 1927

During the year under review the quantity of fish landed, both sea and inland, was much less than in 1926, and the marketed value was considerably lower. The marketed value for the whole of Canada was \$49,497,038, while for 1926 it was \$56,360,633.

The following table shows the marketed value by provinces for the whole of Canada, as compared with the two preceding years:—

	1927	1926	1925
	\$	\$	\$
Nova Scotia.....	10,783,631	12,505,922	10,213,779
New Brunswick.....	4,406,673	5,325,478	4,798,589
Prince Edward Island.....	1,367,807	1,358,934	1,598,119
Quebec.....	2,736,450	3,110,964	3,044,919
Ontario.....	3,670,229	3,152,193	3,436,412
Manitoba.....	2,039,738	2,328,803	1,466,939
Saskatchewan.....	503,609	444,288	494,882
Alberta.....	712,469	749,076	458,504
British Columbia.....	23,264,342	27,367,109	22,414,618
Yukon Territory.....	12,090	17,866	15,370
Total.....	49,497,038	56,360,633	47,942,131

The province of Nova Scotia shows a decrease in value of a million and half dollars from the 1926 value but is a half million dollars ahead of that for 1925. Unfavourable weather conditions during 1927 were responsible for a large part of the decreased catch in this province, together with an over-production in the months of November and December of 1926, when unusually mild and favourable weather conditions aided the fishermen in landing large quantities of fish. The catch of cod and haddock was much lower and gave a decrease in value of \$1,200,000 and \$270,000 respectively.

In the province of New Brunswick, where the drop in value was nearly a million dollars, there were smaller catches of cod, pollock, herring, and lobsters. Notwithstanding a larger quantity of sardines landed, the value was less by some \$170,000.

The value of the fisheries of Prince Edward Island shows a slight increase over that of the previous year, due to higher prices obtained for certain kinds of fish, although the catches in most instances were about the same or slightly lower than in 1926.

In the province of Quebec, sea fisheries district, there were decreases in the catch of cod, herring, and lobsters, three of the chief kinds taken. The catch of salmon was slightly less, while a large increase in the catch of mackerel is recorded.

The increase in the value for Ontario was due to larger catches of herring, trout, and tullibee. Although the catch of whitefish was slightly less than in 1926, a higher value was obtained.

Notwithstanding that the quantity of some of the principal kinds of fish landed was greater, the value shows a decrease. This was owing to poor markets and low prices received especially for pickerel and tullibee, which constitutes a large part of the total production.

The catch of whitefish in Saskatchewan shows an increase, with an increase of over \$60,000 in value. There was also an increased catch of pickerel.

In Alberta there was a large decrease in the catch and value of pickerel, an increase in the catch of pike but a drop in value, more than double the catch of trout, and a slight decrease in the catch of whitefish.

The province of Saskatchewan is the only one of the three Prairie Provinces to show an increased value. This was due to increased catches of pickerel and whitefish. In the province of Manitoba there were larger quantities of pickerel

and tullibee landed but, owing to lower prices, there was a drop in the marketed value of each. Fewer whitefish were taken. In the province of Alberta the total value is less despite the fact that some kinds of fish show large increases in the catch. Trout shows an increase from 3,907 cwt. to 10,882 cwt. with a corresponding increase in value, while tullibee also shows an increase in catch and value. The catch of pike was considerably larger but the value somewhat less.

The province of British Columbia shows a considerable decrease. A big drop in the catch of salmon and a smaller catch of halibut were mainly responsible for the decrease. A much larger quantity of herring and pilchards were taken than in 1926.

#### ATLANTIC COAST

*Cod, Haddock, Hake, and Pollock.*—The total quantities of these kinds of fish landed were 2,612,743 cwt., as compared with 3,429,024 cwt. in 1926. In each of the kinds of fish, in each of the provinces, with one or two exceptions, were decreased catches reported. The greatest falling off was in the catch of cod in Nova Scotia, which dropped from 1,858,944 cwt. in 1926 to 1,331,873 cwt. in 1927. The decrease in the catch of pollock in New Brunswick is quite noticeable, the figures for the year under review and the previous one being 7,693 cwt. and 38,271 cwt. respectively. Hake shows an increased catch in Nova Scotia of 27,000 cwt., there being 119,431 cwt. landed. Of the total of these kinds of fish landed, there were sold fresh and fresh fillets 334,175 cwt., or a decrease of 105,106 cwt. There were produced smoked and smoked fillets 111,431 cwt., compared with 151,357 cwt. in 1926.

The catch of the Lunenburg fleet was 227,590 quintals, or 115,140 quintals less. During the gale of August 24 this fleet suffered the loss of four vessels and their entire crews. The total number of vessels engaged in fishing during 1927 was 83, or 9 fewer than fished in 1926. The prices received for the dried product, while slightly better than in the previous year, were still quite low.

There were fourteen steam-trawlers operating out of Nova Scotia: seven from Canso and seven from Halifax. This number was an increase of two.

*Mackerel, Herring, and Sardines.*—Some 1,270,158 cwt. of these fish were landed. In the previous year 1,531,399 cwt. were landed, or a decrease of 261,241 cwt. during 1927. In Nova Scotia there were 50,000 cwt. less herrings taken, while the catch of mackerel was greater by nearly 5,000 cwt. Some 10,000 cwt. less of herring, only half the quantity of mackerel, and 6,000 cwt. more sardines were taken in New Brunswick. The demand for sardines after the American canners commenced buying was good but the run of sardines somewhat light. In Prince Edward Island the catch of herring shows a decrease of some 12,000 cwt., but owing to better prices the marketed value was only slightly less. The catch of mackerel was slightly more. The catch of herring was much lower in Quebec, while, on the other hand, a large increase of 48,000 cwt. of mackerel is noted.

*Other Sea Fish.*—The catch of halibut was greater by over 3,500 cwt. A decrease of over 5,700 cwt. is noted in the quantity of swordfish taken. The catch of tomcod was 22,744 cwt. and of flounders 9,383 cwt. This is an increase in the former and a decrease in the latter.

*Shellfish.*—The catch of lobsters was 316,831 cwt., which is a decrease of 12,751 cwt. from the 1926 catch and 24,007 cwt. less than the 1925 catch. The

catch by provinces and its disposal is given in the following table, together with a comparison for the year 1926:—

	Catch	*Marketed shell	Canned
	cwt.	cwt.	cases
1927			
Nova Scotia.....	179,673	68,021	55,771
New Brunswick.....	49,752	16,162	18,866
Prince Edward Island.....	62,800	2,097	27,896
Quebec.....	24,606	1,197	11,404
Total.....	316,831	87,477	113,937
1926			
Nova Scotia.....	184,316	71,688	56,277
New Brunswick.....	59,611	15,861	24,041
Prince Edward Island.....	66,298	3,153	29,442
Quebec.....	29,358	847	13,759
Total.....	339,583	91,549	123,519

\*Including lobster meat.

There were 19,462 barrels of oysters taken, which was slightly less than in 1926. Some 43,293 barrels of clams were dug, or an increase of over 1,500 barrels. The quantity of scallops taken shows a large increase, 38,635 barrels being landed, compared with 23,200 barrels during 1926. None of these shell-fish were landed in New Brunswick during the year, the quantity landed in Quebec was only one-third of that landed in 1926, while the landings in Nova Scotia were just about double.

*River Spawning Fish.*—The quantity of salmon landed was 49,113 cwt., or 3,682 cwt. less than in the previous year. A decreased catch was recorded for each of the Atlantic provinces. There was a decrease of 17,962 cwt. in the catch of smelts, only 72,519 cwt. being landed.

Some 54,115 cwt. of alewives were landed in New Brunswick and Nova Scotia, or a decrease of over 17,000 cwt. This fishery depends chiefly on the market for the salted. As the market was bad during the year, little interest was taken by the fishermen in this branch of the industry.

#### INLAND FISHERIES

The catch of whitefish was 185,664 cwt., compared with 190,644 cwt. in 1926. The province of Ontario, where the largest catch of this species is made, recorded a catch of some 61,658 cwt., or a drop of 2,391 cwt. Manitoba came second with 49,114 cwt. landed, a drop of 5,008 cwt. Saskatchewan was third with 41,323 cwt. landed, an increase of 3,656 cwt.

There were 140,019 cwt. of pickerel landed, or an increase of 13,933 cwt. Of the total, Manitoba contributed 99,813 cwt. which was an increase of 12,562 cwt.

The province of Ontario shows a catch of 31,173 cwt. of blue pickerel, a slight increase over the catch of the same kind in 1926.

The catch of pike was 70,473 cwt., which was a decrease of over 2,000 cwt. from the previous year. The province of Manitoba contributed some 40,166 cwt. to the total catch.

Some 58,099 cwt. of fresh water herring or ciscoes were taken in the province of Ontario from the Great Lakes area. This was an increase of over 14,000 cwt. as compared with 1926.

## PACIFIC COAST.

The marketed value of the fisheries of the Pacific coast shows a decrease of \$4,139,205. This is accounted for by much smaller catches of salmon and halibut. There were increased catches of herring and pilchards.

*Salmon.*—The catch of salmon was 1,490,395 cwt., a decrease of 536,160 cwt. The pack was much less, 1,361,977 cases compared with 2,065,190 in 1926. Much of the decrease was due to extension of the close season and other measures for the protection of the salmon. The catch of sockeye while below the average was considered fairly satisfactory. During the fall there was a large run of late sockeye salmon in the Fraser river similar to that which occurred in 1926. The catch of pinks shows a big decrease. Owing to intensive fishing for this species it was deemed necessary to take extra precautions such as extension of the weekly close season and early closing of the season, etc., to ensure sufficient numbers reaching the spawning areas. An average catch of cohoes was made while the catch of chums was somewhat less.

*Halibut.*—The catch of halibut decreased by 14,563 cwt. to 300,532 cwt. It does not appear that the close season now in force has materially affected the catch and it would therefore seem that an extension of close season must be considered or some alternative if the halibut is not to be depleted.

*Herring.*—The catch was 1,724,246 cwt., compared with 1,301,269 cwt. in 1926. Of the catch over one million hundredweights of dry salted herring were produced for sale in the Orient. In the reduction works there were 170,450 gallons of herring oil and 1,838 tons of herring meal produced.

*Pilchards.*—Some 1,368,582 cwt. of these fish were landed, which was nearly fifty per cent more than in the preceding year. Pilchards are canned to a small extent, over 58,000 cases being put up which was more than double the pack of the previous year. The greatest use for these fish, however, is in the manufacture of meal and oil of which 2,673,876 gallons of the former and 12,169 tons of the latter were produced. The number of reduction establishments producing meal and oil from pilchards, herring and whales, was twenty-two and the value of their products (including the products of the whale factories) was \$2,289,952, or nearly double that for 1926.

*Whales and Seals.*—Two whaling stations were in operation during the year. The number of whales taken was 258 and the value of the products \$241,488. This was a decrease from 1926.

There were 1,476 fur seals taken by Indians under the Pelagic Sealing Treaty, compared with 2,824 in the preceding year.

## INSPECTION OF FISH

Inspection of certain kinds of cured fish was carried on as usual under the provisions of the Fish Inspection Act. The Act requires packers to have containers, as well as fish, in accordance with the standards laid down in the regulations, and empowers inspectors to examine such whenever and wherever it is necessary and convenient.

During the year there were inspected on the Atlantic coast 38,058 packages of various kinds containing salted herring, mackerel, alewives and salmon. There were also inspected 33,598 boxes of smoked herring. Further, there were inspected 61,400 empty barrels before they passed into the hands of the packers.

On the Pacific coast there were inspected 243,732 boxes of dry salted herring, each containing 400 pounds, before being exported to the Orient.

## STANDARDS OF SIZE AND QUALITY FOR SALTED COD, ETC.

In the course of the year the department, after consultation with the trade, established by law standards of size and quality for dry and salted cod, haddock, hake, cusk and pollock.

This was done as a result of representations to the effect that there were no well defined standards on which sellers and buyers of these fish could base just and reasonable prices. The same price is usually paid for fish that are not well cured as for fish that are well cured; consequently fishermen who cure their own fish have no incentive to improve the quality of their cure.

The standards thus established have been incorporated in the regulations to the Fish Inspection Act. The department's inspectors of fish curing and packing have been empowered to carry out such inspections as may be required. Inspection is not compulsory. The purpose simply is, for the present, to provide a means of guarding alike the interests of the fisherman and the dealer, when the former agrees to sell and the latter to buy dry or green salted fish in accordance with the established standards, at a price conditional upon the fish at the time of delivery being such as the standards require. Both seller and buyer in that event have an opportunity of requesting the nearest fish inspection officer to inspect the fish in question and decide as to whether they are up to the standard agreed upon.

## INSPECTION OF CANNERIES AND CANNED FISH

The department's officers carried on the inspection of fish canneries of all kinds, the raw material to be used, the finished product and the labelling and marking of the cans during the year, as previously.

There were in operation on the Atlantic coast 438 lobster canneries, 15 clam canneries, and 10 other fish canneries, in which were canned sardines, salmon, haddock, cod, and mackerel.

On the Pacific coast there were operated 77 salmon canneries, in some of which clams and pilchards were also canned.

Through the efforts of the inspecting officers there is from year to year more and more attention being given by canners to maintaining sanitary canning places, ensuring a high-class product, and generally complying with the various requirements of the Meat and Canned Foods Act, and the regulations.

## IMPERIAL ECONOMIC COMMITTEE ON MARKETING CANADIAN FISH

The Imperial Economic Committee appointed by the Governments of the United Kingdom, the Dominions, India, and the Colonies and Protectorates, and acting under its terms of reference from the last Imperial Conference, has completed a comprehensive inquiry into the methods of marketing and preparing for market in Great Britain fish foods produced within the Empire.

Canada was represented on the committee by Mr. J. J. Cowie, of the Department of Marine and Fisheries, and Mr. G. R. Earl, of Yarmouth, N.S., was associated with him as expert advisor from Nova Scotia.

The following is from the committee's report:—

The committee confined its attention to those sea fisheries the products of which largely enter into the food of the people of Great Britain. A number of witnesses representing both producing and marketing interests were examined, while the committee had the advantage of consultation with experienced officials of the home and overseas Governments and of eminent scientists.

Great Britain does not depend solely for its fish supply on catches by British fishermen. There are three sources of supply,—

- (1) landings by British fishing vessels,
- (2) landings from foreign vessels arriving direct from the fishing grounds, and
- (3) shipments as cargo from Empire and foreign ports.

The landings of herring and mackerel are usually more than equal to the home demand. On the other hand the British landings of cod, haddock, and such like fish referred to in the report as whitefish, are not always sufficient for the British demands.

Since the war the total quantity of whitefish sold per year in Great Britain has increased by 500,000 cwts. At the same time the British landings have decreased by 750,000 cwts., while imports, mostly foreign, have increased by 1,300,000 cwts. The British industry complains of this increased foreign competition.

The report goes on to say that if retail fish prices were in closer harmony with those of other foodstuffs and were whitefish ample and regular in supply and excellent in quality the demand would increase enormously. With a 10 per cent increase in the per capita consumption and a displacement of even one-half of the foreign imports there would be required British landings much in excess of any yet attained, while an unsatisfied demand to be met from other Empire sources would remain.

It is pointed out in the report that the Canadian representatives disclaim any desire to further embarrass or damage the British industry, but rather, in so far as it is possible, to supplant foreign importations and to share in the future growth of the market.

The opinion is fairly general that the North sea is being overfished and for some year British trawlers have been turning increasingly to more distant waters, consequently much of the fish that is landed is not in the best condition.

It is the opinion that stability in wholesale prices is the key to reduction in retail prices and in increased consumption. Under existing conditions, fresh fish must be marketed immediately after landing; this causes alternate gluts and shortages. If supplies could be stored even for a few days without deterioration the trade conditions would be revolutionized.

The Canadian shipper of fresh fish meantime cannot possibly foretell the price in the British wholesale market. It is useless for him to send large and irregular supplies and market them quickly in the manner customary in the British industry—i.e., in ice; the result would be to break the market to the detriment of himself and the British trade. He, too, needs regularity and stability, and this can only be attained by sending the best quality suitably preserved, and marketing them gradually.

The committee by this does not intend to convey the impression that prime fresh fish boxed in ice and shipped in refrigerated chambers from Canada cannot be landed in the British markets in good condition, but it does warn the trade against the hazard involved in that method of shipment.

It is noted that development in sea fishing for whitefish in Great Britain has taken the form of increased use of the steam trawler, whereas in Canada fishing by hook and line is most favoured. It is further noted that fish taken by line is less liable to injury than that taken by steam trawler, and as many of the line vessels and boats land their fish on the day of catching it is brought to shore in prime condition.

The committee's conclusions and recommendations, in so far as they concern Canada, may be summarized as follows:—

1. The demand in Great Britain is chiefly for fresh fish.
2. The consumption of whitefish has increased while that of herring has decreased.
3. Except for the requirements of a small export trade in salted cod, all the whitefish landed in Great Britain is consumed there. The demand is expanding, and with lower prices, better average quality, and more regular supplies is likely to expand further.
4. The increased demand has been met so far by increased foreign imports.
5. British vessels have found it necessary to fish on more distant grounds. The fish from these grounds is of variable quality when landed, according to the length of time after capture, as present methods of preservation are inefficient.

6. Better methods of preservation are required for fish, both before and after landing, to avoid wide fluctuations in price due to gluts or scarcity.

7. The present excessive fluctuations in price greatly increase the commercial risks of shipping fresh fish in ice from Canada and tend to discourage that branch of interimperial trade.

8. Believing that the prime essential for all improvement of organization lies in the study and application of better methods of preservation at an economic cost, the committee's principal recommendation is that research be instituted for the purpose of improving methods of preserving fish from the time it has been caught until it reaches the consumer.

9. This research should be based on a central station at a fishing port in Great Britain and a station in the Maritime Provinces of Canada.

10. The Governments of Great Britain and Canada should encourage co-operation and co-relation between the two stations in order to cheapen costs and secure more rapid results.

The report notes that the Canadian Government, recognizing that the development of an export trade in fish in prime condition depends on a satisfactory solution of the problem of preservation, has already established such a station at Halifax, Nova Scotia, where the methods of brine freezing fish are being tested and demonstrated. Some work of this nature has also been done in Great Britain at the Low Temperature Research Institute at Cambridge, but that institute suffers from the disadvantage of having an inland location.

11. Recent discoveries have drawn attention to the special value of cod liver oil as a source of vitamins, not only for medicinal purposes but for strengthening other foods deficient in this substance, and investigation is recommended into the causes of variation in the vitamin content of the oil and the methods of refining it so that the full vitamin content may be retained and the market objections to taste and odour eliminated.

12. It is necessary for the economic development of the industry to exploit to the fullest extent the by-products. Whitefish meal has special value for feeding animals and poultry. While there is a large market in Germany for fish meal, certain of the meat trades in Great Britain have opposed its use on the ground of its inducing taint. Repeated experiments at research stations, however, have demonstrated that there is no risk of taint, if the meal is used in the proportions and in the methods advocated by the English Ministry of Agriculture and Fisheries. The opening of an extended use of fish meal in Great Britain is very great and its development would benefit both the live stock industry and the fishing industry.

The committee believes a greater development of a trade from the fishing ports in fillets instead of whole fish is the line clearly indicated by economy, which would result in a greater beneficial use of by-products.

With respect to salted and dried fish, the report states there is a market for cured or salted cod in the British West African Colonies which, if studied and suited, will probably increase. It is mainly supplied by Norway meantime.

With respect to canned salmon, the committee states that in its report on meat issued two years ago, it pointed out that the compulsory marking of the country of origin on the cans would enable the British consumer to select Empire canned salmon in preference to foreign goods. As a result the British Merchandise Marks Act was amended in 1926 to give effect to this, and it is understood that the British Columbia producers are for the present watching its operation and the matter is left there, except to say that a high standard of quality must be maintained.

Besides taking part in the formal inquiries of the committee and assisting in drafting the report, the Canadian representatives made extended informal personal investigations amongst the trade in Great Britain and a report of their findings will shortly be made public.

## FISHERIES INTELLIGENCE SERVICE

Under this service there was carried on during the season of 1927:—

1. The collection of monthly statistics of the sea fisheries, and the compilation of such in a summarized form for publication through the press each month.

2. The publication of quarterly bulletin containing the statistics in detail. The bulletin is distributed to the trade and all directly concerned. The statistics are practically all collected by the regular fishery officers while performing their other duties as such and at very little additional cost.

3. The collection of information concerning supplies of bait day by day along certain stretches of the coast during the spring and summer months. The information is gathered by the officers of the department, who send it by telegram daily to certain ports where it is posted up for information of masters of fishing vessels and those looking for bait.

## FISHING BOUNTY

Under the authority of "An Act to Encourage the Development of the Sea Fisheries and the Building of Fishing Vessels," the sum of \$160,000 is appropriated annually by the Governor in Council. It is distributed under the name of fishing bounty, by the Department of Marine and Fisheries amongst fishermen, and fishing vessel and boat owners on the Atlantic coast under regulations made from time to time by the Governor in Council.

For the year 1927, payment was made on the following basis:—

To owners of vessels entitled to receive bounty, \$1 per registered ton, payment to the owner of any one vessel not to exceed \$80.

To vessel fishermen entitled to receive bounty, \$8 each.

To owners of boats measuring not less than 12 feet keel, \$1 per boat.

To boat fishermen entitled to receive bounty, \$6.60 each.

There were 9,609 bounty claims paid. In the preceding year there were 11,036 bounty claims paid.

The total amount paid was \$158,375.80 allocated as follows:—

To 543 vessels and their crew.....	\$ 44,462 50
To 9,066 boats and their crew.....	\$113,913 30

## FISHING BOUNTY EXPENDITURE FOR 1927-28

County	Boats	Men	Amount	Vessels	Tons	Avg. Tons	Men	Amount	Total Amount
			\$ cts.					\$ cts.	
<i>Nova Scotia</i>									
Annapolis.....	141	225	1,626 00	1	15	15	5	55 00	1,681 00
Antigonish.....	130	171	1,254 60						1,254 60
Cape Breton.....	298	542	3,874 20	27	430	16	108	1,294 00	5,168 20
Cumberland.....	2	3	21 80						21 80
Digby.....	314	518	3,729 80						3,729 80
Guyshoro.....	535	852	6,158 20	23	382	17	114	1,294 00	7,452 20
Halifax.....	855	1,117	8,225 20	68	1,036	15	284	3,308 00	11,533 20
Inverness.....	223	463	3,195 80	4	47	11	19	199 00	3,394 80
Kings.....	37	53	386 80						386 80
Lunenburg.....	426	513	3,810 80	136	7,454	55	1,881	22,501 50	26,312 30
Pictou.....	13	19	138 40						138 40
Queens.....	138	244	1,748 40	14	220	15	72	796 00	2,544 40
Richmond.....	336	583	4,180 80	13	182	14	41	505 00	4,685 80
Shelburne.....	444	819	5,848 40	20	553	28	163	1,857 00	7,705 40
Victoria.....	218	328	2,401 00	8	115	14	35	393 50	2,794 50
Yarmouth.....	122	273	1,923 80	8	428	53	119	1,380 00	3,303 80
Total.....	4,232	6,723	48,524 00	322	10,862	34	2,841	33,583 00	82,107 00

FISHING BOUNTY EXPENDITURE FOR 1927-28—*Concluded*

County	Boats	Men	Amount	Vessels	Tons	Avg. Tons	Men	Amount	Total Amount
<i>New Brunswick</i>			\$ cts.					\$ cts.	\$ cts.
Charlotte.....	233	397	2,849 20	1	12	12	2	27 00	2,876 20
Gloucester.....	312	767	5,366 20	198	3,256	16	853	10,079 00	15,445 20
Kent.....	82	144	1,031 40	4	42	10	9	114 00	1,145 40
Northumberland.....		1	5 60	5	51	10	13	153 00	158 60
Restigouche.....	5	8	57 80	1	10	10	3	34 00	91 80
St. John.....	18	26	189 60						189 60
Total.....	650	1,343	9,499 80	209	3,371	16	880	10,407 00	19,906 80
<i>Prince Edward Island</i>									
Kings.....	257	347	2,537 20				1	7 50	2,544 70
Prince.....	574	1,091	7,585 35	1	12	12	1	20 00	7,605 35
Queens.....	133	269	1,889 40	2	24	12	4	56 00	1,945 40
Total.....	964	1,707	12,011 95	3	36	12	6	83 50	12,095 45
<i>Quebec</i>									
Bonaventure.....	484	842	5,985 20	3	33	11	8	97 00	6,082 20
Gaspé.....	2,106	4,212	29,846 85	6	84	14	26	292 00	30,138 85
Matane.....	90	130	944 00						944 00
Saguenay.....	540	1,004	7,101 50						7,101 50
Total.....	3,220	6,188	43,877 55	9	117	13	34	389 00	44,266 55
Grand total.....	9,066	15,961	113,913 30	543	14,386	26	3,761	44,462 50	158,375 80

## FISH CULTURE

The more important fresh-water and anadromous food and game fishes, such as Atlantic salmon and speckled trout in the Maritime Provinces, whitefish and pickerel in the Prairie Provinces, and Pacific salmon and trout in British Columbia, were given first consideration in the fish cultural operations of the department during the calendar year 1927, but in response to a constantly increasing public demand greater attention was paid to game fish, and the distribution of game trout was slightly better than ever before.

Some progress was made in the development of a brood stock of trout at the St. John hatchery, New Brunswick, where nearly two and three-quarter million trout eggs were produced during the year. Increased facilities for retaining and feeding fry, so as to afford a longer season for distribution, were provided at several establishments where such development was feasible, as the demand for assistance from areas that are beginning to feel the need of restocking is becoming more and more insistent.

The total distribution was considerably less during 1927 than it was during the previous year, due to the fact that eight hatcheries in Ontario were transferred to the provincial Department of Game and Fisheries in 1926, after the fry produced therein were disposed of, and were not operated by this department in 1927. The distribution from these eight hatcheries in 1926 was approximately four hundred and fifty-four million five hundred thousand, and, omitting the distribution from these establishments, the total output in 1927 was over twenty-seven million greater than in 1926.

In addition to the distributions that were made from the hatcheries, thirty-four lakes and streams received allotments of fry or older fish from other bodies of water. This work was largely confined to the Prairie Provinces, where there are many districts that are not readily accessible to existing hatcheries.

It involved the capture and transfer, in many instances for a considerable distance, of thirty-four thousand nine hundred and twenty-six fish comprising seven different species.

The seeding of remote and isolated waters (to which it is not feasible to transfer fry from existing hatcheries) was continued in British Columbia, and nine million seven hundred and forty-six thousand sockeye salmon eggs, collected in the Pemberton district below Hell's Gate on the Fraser and in the Babine district in the Skeena watershed, were planted in the one-time spawning beds of such important areas as Stuart, Francois, and Quesnel lakes in the Upper Fraser, above Hell's Gate.

Examinations and inspections were continued in the different provinces, with a view to locating waters where trout might be obtained for hatchery purposes, and with a view to locating sites where the fish cultural service might be advantageously extended by the construction of new establishments in districts that are difficult to cover from existing hatcheries.

As opportunity offered, the general inspection of waters throughout the country was continued by the officers and employees of the fish cultural and fishery services.

The Canadian National Railway, Canadian Pacific Railway, Dominion Atlantic Railway, Fredericton and Grand Lake Coal and Railway Company and New Brunswick Coal and Railway, Esquimalt and Nanaimo Railway, Kettle Valley Railway, and the Cumberland Railway and Coal Company continued their assistance and co-operation by furnishing free transportation for shipments of game fish and game fish eggs with their attendants. The extent of this co-operation is indicated by the following summary:—

Railway	Total mileage on trip passes	Number of passages	Mileage Baggage car permit			Number Cases or cans			Number of permits
			Full	Empty	Total	Full	Empty	Total	
C.N.R.....	25,317	235	12,473	11,624	24,097	991	974	1,965	213
C.P.R.....	14,219	95	8,253	7,388	15,641	393	393	786	103
D.A.R.....	2,740	26	1,370	1,370	2,740	136	136	272	26
F. & G.L.C. & R. Co. & N.B.C. & R.....	180	4	90	90	180	16	16	32	4
E. & N. Ry.....	1,186	21	666	605	1,271	76	69	145	24
K.V. Ry.....	408	2	270	270	540	2	2	4	4
	44,050	383	23,122	21,347	44,469	1,614	1,590	3,204	374

NOTE.—Number of passages refers to transportation one way. A return trip counts as two passages. Number of permits refers to one-way passage for cases or cans, either by permit, special authority or free transportation without a permit form.

The department participated with assortments of hatchery products and equipment in several exhibits for portraying natural resources. These exhibits were of considerable educational value and attracted great interest.

Gratifying reports regarding the results that are apparent from the distribution of hatchery products continued to come in from all districts where fish cultural operations are carried on in a systematic way.

Considerable expansion was made in the Fish Cultural Service in the provinces in which the fisheries are administered by the Dominion Government. Sites were selected for salmon and trout hatcheries in Antigonish and Yarmouth counties, N.S.; the pond facilities for fry and brood fish were largely extended at the St. John hatchery and a new salmon and trout hatchery was built on White Marsh Creek one mile from Florenceville, N.B.; a contract was awarded for a whitefish hatchery on Lesser Slave Lake, for a trout hatchery in the Waterton Lakes Park, Alberta, and a subsidiary hatchery was established in

the Jasper National Park, Alberta; the Nelson hatchery was moved to larger and better quarters in the basement of the Armory and a sub-hatchery was established at Summerland, B.C. Detailed description appears in the Report of the Fisheries Engineer.

At the close of 1927 there were in active operation, apart from the new establishments above mentioned, twenty-four main hatcheries, seven subsidiary hatcheries, four salmon retaining ponds, and several egg-collecting stations. The output from these establishments for the calendar year 1927 was two hundred and ninety-five million two hundred and eighty-three thousand seven hundred and eighty-two, as shown by species in the following statement:—

STATEMENT, BY SPECIES, OF THE FISH AND FISH EGGS DISTRIBUTED FROM THE HATCHERIES DURING THE YEAR ENDED DECEMBER 31, 1927

Species	Green eggs	Eyed eggs	Fry	Advanced fry	Fingerlings	Yearlings and older fish	Total distribution
<i>Salmo salar</i> —Atlantic salmon.....		503,320	5,916,403	5,652,000	8,199,970		20,271,693
<i>Salmo salar sebago</i> —Landlocked salmon.....		3,400		50,000	93,680	200	147,280
<i>Salmo irideus</i> —Rainbow trout.....		205,700	160,000	32,000	83,259	209	481,168
<i>Salmo clarkii</i> —Cutthroat trout.....		151,840	1,153,310				1,305,150
<i>Salmo gairdneri</i> —Steelhead salmon.....		96,505	140,769	4,000	8,007		249,281
<i>Salmo gairdneri</i> —Kamloops trout.....		1,684,000	920,520				2,604,520
<i>Salmo leucomaenis</i> —Lochleven trout.....		3,132				10	3,142
<i>Salmo fario</i> —Brown trout.....		18,684	621,935		33,052	11	673,682
<i>Oncorhynchus nerka</i> —Sockeye salmon.....		29,197,000	65,729,113	608,000	4,658,665	188	100,102,966
<i>Oncorhynchus tshawytscha</i> —Spring salmon.....		755,000	563,448		217,254		1,535,702
<i>Salvelinus fontinalis</i> —Speckled trout.....		221,450	697,025	965,675	1,931,177	6,023	3,821,350
<i>Coregonus clupeaformis</i> —Whitefish.....	2,290,000		143,735,000				146,025,000
<i>Cristivomer namaycush</i> —Salmon trout.....			207,770		78		207,848
<i>Stizostedion vitreum</i> —Pickerel.....			17,765,000				17,765,000
	2,290,000	32,840,031	237,610,293	7,311,675	15,225,142	6,641	295,283,782

The following statement shows the numbers of fry of the different kinds that were distributed in the several provinces in which fish cultural operations are conducted by the Dominion Government:—

HATCHERY OUTPUT, BY PROVINCES, OF EGGS, FRY AND OLDER FISH DURING 1927

Nova Scotia—			
Atlantic salmon.....		7,293,700	
Speckled trout.....		1,347,404	
			8,641,104
New Brunswick—			
Atlantic salmon.....		11,790,198	
Brown trout.....		101,747	
Landlocked salmon.....		147,280	
Lochleven trout.....		3,142	
Rainbow trout.....		30,202	
Salmon trout.....		78	
Speckled trout.....		1,556,509	
			13,629,156
Prince Edward Island—			
Atlantic salmon.....		699,900	
Rainbow trout.....		2,259	
Speckled trout.....		503,496	
			1,205,655
Manitoba—			
Pickerel.....		12,835,000	
Whitefish.....		122,325,000	
			135,160,000

HATCHERY OUTPUT BY PROVINCES, ETC.—*Concluded*

Saskatchewan—			
Pickerel.....	4,930,000		
Salmon trout.....	207,770		
Whitefish.....	21,410,000		
			26,547,770
Alberta—			
Cutthroat trout.....	1,024,740		
Brown trout.....	571,935		
Rainbow trout.....	243,007		
Speckled trout.....	3		
Whitefish.....	2,290,000		
			4,129,685
British Columbia—			
Atlantic salmon.....	487,895		
Cutthroat trout.....	280,410		
Kamloops trout.....	2,604,520		
Rainbow trout.....	205,700		
Sockeye salmon.....	100,192,966		
Speckled trout.....	413,938		
Spring salmon.....	1,535,702		
Steelhead salmon.....	249,281		
			105,970,412
Total.....			295,283,782

Full particulars regarding the extent and scope of this service appear in the Annual Report on Fish Culture for 1927.

## NORTH AMERICAN COMMITTEE ON FISHERY INVESTIGATIONS

Two meetings of the North American Committee on Fishery Investigations have been held during the past year, one at Toronto, Ont., on October 19, 1927, and one at Boston, Mass., on June 2, 1928.

The haddock fishery was given particular attention. Study of the total catch made on this side of the Atlantic reveals that there has been on the whole little change since as far back as the eighties of the last century, though a slow increase since nineteen hundred is evident. This increase has been in the New England fishery. Where formerly haddock were pickled and dried, now they are sold fresh and smoked, as finnan haddies and fillets. The New England fishery has benefited by this change, while in Canada the development of the fresh and smoked haddock trade has scarcely made up for the passing away of the trade in pickled and dried fish. There is no indication that the stock of haddock as a whole is in danger of exhaustion, but rather that increased catches could readily be made. However, the southern banks, where the New England fishery is intensively prosecuted, are, or soon will be, over-fished. The committee is urging prompt action in investigating this fishery thoroughly, so that measures for conservation may be devised and adopted before serious depletion occurs.

The co-operative study of the mackerel, which has been in progress for several years past, has revealed the fact that breeding is particularly successful in certain years. 1921 and 1923 were such years and have furnished the bulk of the mackerel recently in American waters. Three important spawning grounds have been found, in which the floating eggs and fry abound during the summer season, (1) the southern shallow part of the gulf of St. Lawrence, (2) the southern part of the gulf of Maine off the Massachusetts coast, and (3) the coastal waters off New York and New Jersey. The migrations of the mackerel, a most fertile field for argument, are being studied by fastening tags to the fish. An entirely satisfactory tag has not yet been devised, but celluloid bands on the tails have been used extensively. These have shown that the mackerel that strike the coast near cape Cod in the spring, remain on the New England coast rather than pass northeastward to Nova Scotia. Those that strike near cape Sable, N.S., in late spring spread both eastward and westward along the coast,

some remaining in the vicinity, some going north into the bay of Fundy, or westward to the New England coast, and others going eastward as far as Cape Breton. These migrations are accomplished by some of the fish at a rate of about twenty-five miles per day. Mackerel that come to the coast near Canso, at the eastern end of Nova Scotia, in part migrate around Cape Breton into the gulf of St. Lawrence to the coast of Prince Edward island, but none go westward. The evidence indicates that a series of schools strikes the various parts of the coast, and that these remain fairly distinct, but not completely so. Mixing of the schools is somewhat greater during the winter, as recaptures of the fish in subsequent years show greater spreading up and down the coast.

Mr. Sette, under the Sub-Committee on Statistics, prepared a report on the cod fisheries of the American side of the North Atlantic, in which five countries, Newfoundland, France, Canada, United States, and Portugal, have participated. This report brings together the available statistics on this fishery so as to show its size, trend, and the relative importance of the fisheries of each participating country. The report, entitled "Statistics of the Catch of Cod Off the East Coast of North America to 1926," has been published.

The study of the fisheries statistics of the various countries has revealed the need for having the weights of the fish uniformly taken on the basis of a particular condition of the fish, for example either "round" or "guttled". Steps are being taken toward this end.

#### INTERNATIONAL FISHERIES COMMISSION

This commission was appointed under the provisions of the Treaty for the Protection of the Pacific Halibut between Canada and the United States, and is charged with making a thorough investigation into the life history of the Pacific halibut, as well as recommendations to the two Governments as to the regulation of the fishery which may seem desirable for its preservation and development. One of the provisions of the Treaty provides for an annual close season of three months—November 16 in each year to February 15 following, both days inclusive—but upon the recommendation of the commission this close season may be modified or suspended at any time after three such seasons. As the treaty became effective on November 1, 1924, the third close season expired in February of this fiscal year, and as anticipated in my report of last year the commission, immediately following the termination of that close season proceeded to prepare its first report. The following extract from the report shows the extent and condition of the fishery, and the recommendations of the commission:—

Fisheries for halibut are prosecuted in the North Pacific and the North Atlantic oceans, and yield about ninety millions of pounds annually. The Pacific halibut fishery, which is covered by the terms of this convention, is the greatest in the world. The annual catch exceeds fifty millions of pounds, which represents about sixty per cent of the world's catch. Of the remainder about thirty millions are credited to European countries and six millions to the Atlantic coast of this continent. The value of the Pacific halibut catch to the fishermen is about seven million dollars annually, and it is consequently one of the most important fisheries in North American waters. The Pacific halibut is, therefore, one of the most important species of food fishes indigenous to the waters of the North American continent. The halibut fishery banks of the eastern Pacific are shown in plates Nos. 1-3. The division into areas shown thereon is for statistical purposes and should not be confused with those referred to in the commission's recommendations, which will be submitted later on.

The Pacific halibut fishery originated soon after the first railway communication was established between the two coasts of the United States. It is, therefore, comparatively young. It had its inception in 1888 near Cape Flattery, at the entrance to Juan de Fuca strait. The fishery expanded rapidly and by 1910 it had extended to grounds off Cape Ommaney, Baranof island, six hundred miles to the north. Subsequent expansion has extended the fishery until it now covers about 1,800 miles of coast. Formerly as many fish were taken from the 600 miles stretch as are now procured from the entire area of 1,800 miles. The banks on the eastern side of the gulf of Alaska, which yield spawning fish, were

first exploited in 1913. In 1926 the larger boats made by far the greater part of their catches in the vicinity of Kodiak island, on the western side of the gulf of Alaska, about 1,200 miles beyond the original fishery. The catch on the older grounds south of cape Ommaney has decreased from a total in excess of fifty million pounds in 1910 to about twenty-one millions in 1926, and much greater effort was exerted in making the catch in the latter year. It is evident that the present level of production has been maintained by extending fishing operations to new areas, as the catch on the older grounds decreased, and by increasing the intensity of the fishing effort.

The amount of gear now used on the older banks is about two and one-half times the quantity formerly used, yet the present catch is only about forty per cent of the former yield from these grounds. Under the stress of this great intensification of fishing effort the abundance of fish on the older banks has fallen enormously, to sixteen per cent of the abundance in 1906. Where in 1906 the catch per set of a unit of fishing year was nearly 300 pounds, in 1926 it was below 50 pounds. Expressed in another way it required six units of gear to catch as many fish as one unit caught in 1906. The decline has gone on at an even rate and shows no tendency to slacken. Accompanying this fall in abundance there has been a decrease in the average size of the fish landed, and a great increase in the percentage of undersized fish. For example between 1919 and 1926 the percentage of undersized fish from the older banks increased from twenty to thirty per cent.

The more recently exploited banks to the westward show the same trend, the catch having fallen from 160 pounds per unit of gear in 1923 to 100 pounds in 1926, and was still lower in 1927, while at the same time there was an increase in the number of fish under eleven and three-quarter pounds.

The rapidity of the decline is regarded as especially serious because of the very slow rate of the growth of the halibut, an adult being from twelve to twenty-five years, or over, in age. Hence the present decline has taken place within the life span of one halibut of ordinarily large size. As nearly all the fish which are being caught now were spawned eight or ten years ago, the abundance of the younger fish, which will annually be available for capture in the next ten years, has already been established. If these are greatly reduced in numbers, and the intensity of the fishery is maintained, the outlook for a future stock of spawning fish sufficient to maintain the supply, presents a hopeless picture. In fact the commission's investigations indicate that relatively few mature halibut are now found on the older banks.

These illustrations demonstrate beyond a doubt that the fishery is in a very serious condition, and that the banks cannot stand the intensity of fishing to which they are subjected. The commission is fully convinced that the conditions are so serious that no delay should be permitted in the adoption of additional conservation measures. In the light of the investigations made, such action is essential to the maintenance of the fishery.

#### RECOMMENDATIONS

It is recommended that power be given proper governmental authorities:—

1. (a) To establish areas, within each of which, if deemed necessary for the preservation of the fishery there, the total catch of halibut may be reduced by a predetermined percentage annually, commencing not less than one year after the putting into force of this recommendation, until the fishery therein shall reach a state of stability of yield.

(b) To determine upon the amount of this percentage reduction, and to revise the same from time to time as may be found necessary, the intent being to restrain any increase in the amount of fishing within such area.

2. To close permanently to all fishing the two areas herewith defined, and known to be populated by small immature halibut, and to close such other grounds as may be found by the commission to be populated by a similar class of fish.

3. To prevent the use of any fishing gear deemed unduly destructive.

4. To extend the present closed season by two weeks at its beginning, making the closure for all fishing in all areas from November 1 to February 15, both dates inclusive, and to facilitate future alterations in the length of close season.

5. To license all vessels fishing for halibut in treaty waters, under such terms as are necessary for the purpose of the treaty, including statistical returns, and for clearance to regulated waters.

The reasons for the above recommendations are clearly set out by the commissioners. The report has been printed and those interested may obtain copies thereof on application to the department.

The recommendations of the commission are under the consideration of the two Governments.

## MARINE BIOLOGICAL BOARD

All four stations of the Board were in operation during the year. These are located at St. Andrews, N.B., Halifax, N.S., Nanaimo, B.C., and Prince Rupert, B.C.

At St. Andrews and Nanaimo fundamental researches such as life-history, growth and food of fishes, etc., and at Halifax and Prince Rupert investigations connected with the methods of handling and preserving the products of the commercial fisheries are carried on.

In the course of the year the staff of the board on the Atlantic coast conducted short scientific and practical courses of instruction for hatchery officers, cannery managers and fishermen, all of which were beneficial and much appreciated.

During the year an arrangement was come to by the Department, the board, and Dalhousie University of Halifax, N.S., whereby with the assistance of the department and the board the university has undertaken to establish a graduate course in fisheries. It is anticipated that the first stages of the course will be started in the coming university year.

The following were members of the board and its various committees during the year:—

Dr. J. Playfair McMurrich, Chairman, Toronto, Ont.

J. J. Cowie, Hon. Secretary-Treasurer, Ottawa, Ont.

Dr. Philip Cox, Fredericton, N.B.

Dr. C. J. Connolly, Antigonish, N.S.

Dr. E. E. Prince, Ottawa, Ont.

Very Rev. Canon Huard, Quebec, P.Q.

Dr. A. H. Hutchinson, Vancouver, B.C.

Dr. W. T. MacClement, Kingston, Ont.

Professor J. N. Gowanlock, Halifax, N.S.

Professor A. Willey, Montreal, P.Q.

John Dybhavn, Prince Rupert, B.C.

A. Handfield Whitman, Halifax, N.S.

## MEMBERS OF CENTRAL EXECUTIVE COMMITTEE

Dr. J. P. McMurrich. J. J. Cowie.

Dr. W. T. MacClement. Dr. E. E. Prince.

Professor A. Willey.

## MEMBERS OF ATLANTIC SUB-EXECUTIVE COMMITTEE

A. Handfield Whitman, Chairman.

Professor Gowanlock.

Dr. C. J. Connolly.

Dr. A. G. Huntsman, Secretary.

## MEMBERS OF PACIFIC SUB-EXECUTIVE COMMITTEE

John Dybhavn, Chairman.

Dr. A. H. Hutchinson.

Dr. W. A. Clemens, Secretary.

## RESEARCH COMMITTEE

Dr. A. G. Huntsman, Chairman.

Dr. W. A. Clemens.

Dr. A. H. Leim,

Mr. J. A. Rodd,

Dr. R. E. Foerster, Secretary.

A detailed report on the work of the board's staff will be found at appendix No. 2 of this publication.

## PROSECUTIONS

The names of those against whom action was taken as a result of the violation of the Fisheries Act are being published in this report separately and will be found in appendix No. 8.

## SCALLOP AND OYSTER INVESTIGATIONS

The following investigations were carried on by the department's naturalist during the season of 1927:—

Scallop investigations in Mahone Bay, N.S.

Exploratory work on the coast of three Maritime Provinces in search of scallop beds.

Examination of oyster beds in New Brunswick.

Details of these investigations will be found in appendix No. 3.

The loss of life of those engaged in the industry was very heavy, no less than four vessels and their entire crews being lost in one storm on the Atlantic coast. The total loss of life was one hundred and eleven, three of whom were drowned on the Pacific coast and the remainder on the Atlantic coast.

Yours obedient servant,

A. JOHNSTON,

*Acting Deputy Minister of Fisheries.*

## APPENDIX NO. 1

## REPORTS OF INSPECTORS OF FISHERIES

REPORT OF CHIEF INSPECTOR WARD FISHER, PROVINCE OF  
NOVA SCOTIA, FOR 1927-28

The value of the fisheries for this province for the year 1927 was \$10,783,631. While this does not compare altogether favourably with the previous year, it must be remembered that 1926 was a banner year with a total value amounting to \$12,505,922. This latter value has not been exceeded since the years closely following the end of the war. In order to arrive at a better valuation other than 1926 we must go back to the year 1920, when prices were inflated and the total value amounted to \$12,742,659.

The value of the fisheries to the province of Nova Scotia for the past five years has been as follows:—

1923 .....	\$ 8,448,385
1924 .....	8,777,251
1925 .....	10,213,779
1926 .....	12,505,922
1927 .....	10,783,631

Weather conditions throughout the greater part of the year were unfavourable for fishing. Rough, boisterous, and foggy weather prevailed.

The fresh fish industry was in an unsatisfactory condition at the opening of the year. The unusually mild weather of November and December, 1926, resulted in large catches which the dealers were unable to dispose of, and as a consequence there was, at first, little demand for the catches of the shore fishermen at a price that would give a living wage. It is gratifying, however, to report that the fresh fish trade is continually expanding, and that there is an increased demand particularly for finnan haddies and fillets.

The catch of the chief commercial varieties shows a decrease in most instances as compared with the year before, with the exception of the mackerel, halibut, and scallop fisheries.

## COD

The catch was 1,331,873 cwt., with a landed value of \$2,433,699 and a marketed value of \$3,455,722, as compared with a catch of 1,858,944 cwt., having a landed value of \$3,634,923 and a marketed value of \$4,652,858 for 1926. The decrease in the catch as compared with the preceding year was 527,071 cwt., the landed value \$1,201,224, and the marketed value a decrease of \$1,197,086.

The Lunenburg fleet was a vital factor in the decrease shown in the cod fishery. In this connection it must be recalled that four of the Lunenburg vessels were lost in the gale of August 24 along with their crews of more than eighty men. The shore fishermen were also handicapped by unfavourable weather.

## THE LOBSTER FISHERY

The total lobster catch for 1927 was 179,673 cwt., having a marketed value of \$3,255,627, as compared with 184,316 cwt. and \$3,386,416 for 1926.

The total pack for 1927 was 55,771 cases, as compared with 56,277 cases. The total value of the pack was \$1,727,105 for 1927, as compared with \$1,753,150 for 1926.

The total marketed value for 1927 was \$3,255,627, as compared with \$3,386,416 for 1926.

The following is the catch and pack by counties:—

	Catch		Pack	
	Cwts.	Marketed value	Cases	Value
		\$		\$
Inverness.....	14,590	192,704	5,926	177,678
Richmond.....	8,575	110,530	2,806	85,352
Cape Breton.....	12,111	186,948	5,965	180,133
Victoria.....	7,248	75,260	1,600	62,418
	42,524	565,442	16,297	505,581
Halifax.....	13,207	235,960	3,014	92,790
Guysboro.....	20,364	352,859	6,844	213,708
Antigonish.....	10,425	182,843	5,845	177,834
Pictou.....	14,002	273,427	7,629	229,991
Colchester.....	176	2,716	83	2,407
Cumberland.....	4,812	64,146	1,914	56,196
	62,986	1,111,951	25,329	772,926
Lunenburg.....	3,724	64,267	590	18,300
Queens.....	3,818	58,528	186	6,324
Shelburne.....	21,708	474,694	5,277	162,102
Yarmouth.....	34,542	730,247	7,003	227,254
Digby.....	9,683	229,749	1,089	34,618
Annapolis.....	609	19,554		
Kings.....	79	1,195		
	74,163	1,520,234	14,145	448,598

The marketing of the pack was not profitable. Prices were low and demand poor. Japanese crab meat was offered, especially in the European market at a very attractive price which greatly interfered with the success of the lobster packers.

#### HADDOCK

The landings of haddock amounted to 384,207 cwts., as compared with the previous year when 458,292 cwts., were taken. The landed value for the year was \$660,669 and the marketed value \$1,402,135, as compared with a landed value of \$838,716 and a marketed value of \$1,671,971 for 1926. The decrease in the landed value was \$178,047 and the marketed value \$269,836.

#### THE MACKEREL FISHERY

The mackerel fishery shows an increase in the catch, landed value and marketed value. During the year 72,306 cwts. were landed, as against 67,580 cwts. in 1926. The landed value was \$236,796 and the marketed value \$338,851, as compared with a landed value of \$173,049 and a marketed value of \$285,961 for the previous year. The increase in the marketed value registers \$52,890.

#### HERRING

The landings of herring were less than in 1926 when the catch was 264,823 cwts., as compared with a catch of 214,560 cwts. this year. Naturally the values also fell off. The marketed value this year was \$482,458, as compared with \$547,548 last year, a decrease of \$65,090.

## HALIBUT

The halibut fishery shows an increase in landings and values. This year the catch was 27,551 cwts., as against 23,725 cwts. in 1926. The increase in the landed value was \$46,771 and the marketed value \$86,959. Most of the months record this fishery as showing gains over the previous year.

## SALMON

The salmon catch was 12,819 cwts., having a marketed value of \$233,189, as compared with 13,428 cwts. and \$253,272 in 1926.

## SCALLOPS

The scallop fishery especially in the Bay of Fundy district continues to expand and show a healthy growth. The outlook for this fishery is bright indeed. Many more new boats were engaged in this fishery this year than in any previous year, and it is confidently expected that the output will steadily increase from year to year. This industry is only in its infancy in so far as Yarmouth, Digby and Annapolis counties are concerned, and the progress that has already been made is really remarkable. This year 37,607 barrels were landed, as compared with 19,918 barrels last year. The marketed value was \$212,838, as against \$138,472 for 1926, an increase of \$74,366.

## SMELT

The decrease in the smelt catch is largely attributed to the mild weather which prevailed during the early part of the smelt fishing season, 7,110 cwts. were taken while the catch last year was 10,981 cwts. The marketed value of the fishery naturally suffered, amounting to \$124,653 this year, as compared with a value of \$165,630 last year.

The following reports by districts will be of interest, showing the local conditions with respect to catches and values:—

## DISTRICT No. 1, CAPE BRETON.—INSPECTOR MCLEOD

The outstanding features of the year, compared with 1926, are decreases in the quantities and values of cod, haddock, swordfish, lobsters, smelts, pollock and alewives, and increases in the quantities and values of mackerel, halibut, salmon, hake and cusk.

*Lobsters.*—The catch of lobsters was 42,524 cwts., marketed value \$565,442, as compared with 42,874 cwts., marketed value \$660,006 for 1926.

The decrease in the catch is due to unfavourable weather conditions and drift ice which prevented operations at the opening of the season. These fish were very plentiful in the waters surrounding Isle Madame, where an increase of 2,017 cwts. is noted as compared with 1926. On account of the low prices offered for cod, haddock and mackerel, the fishermen of this district prosecuted the lobster fishing with the utmost vigour.

The largest catches were landed at Mainadieu, Petit de Grat and Port Hood Island.

*Cod.*—The catch was 139,096 cwts., having a marketed value of \$290,882, as compared with 136,505 cwts. and \$394,870 for 1926.

A large increase in the catch is noted at the ports of North Sydney, Ingonish and Neil's harbour, where this branch of the industry was prosecuted intensely during the fall months when good prices prevailed.

*Haddock.*—The total catch was 68,344 cwts., having a marketed value of \$132,485, as compared with 76,428 cwts., and \$250,569 for 1926.

Decreases of 8,084 cwts. in the catch, and \$118,084 in marketed value are noted. The large falling off in the catch is due to the following reasons: (a) Rather than fish for the low prices offered the fishermen turned their attention to other kinds of work which they found more remunerative. (b) Only one trawler operating, as compared with four during 1926. (c) These fish were not as plentiful as in the previous year, and it is supposed that they passed by before the trap-nets were set in the spring.

The largest catches were landed at Ingonish, Hawkesbury and Petit de Grat.

*Mackerel*.—The catch was 29,832 cwts., having a marketed value of \$122,425, as compared with 20,473 cwts., valued at \$84,623 for the preceding year, showing an increase of 9,359 cwts. in catch and \$37,802 in marketed value.

The largest landings were at L'Ardoise, Cheticamp and Louisburg.

These fish were very plentiful during the spring at Ingonish, Neil's harbour and Isle Madame; but on account of the low prices offered, the fishermen only operated in a half-hearted manner. Fine catches were landed at Margaree and Cape Rouge during the fall. For some unaccountable reason the fall run of mackerel do not appear in the waters surrounding Port Hood island, where they used to strike in very plentifully eight or ten years ago.

*Halibut*.—The catch was 4,772 cwts., having a marketed value of \$92,194, as compared with 3,775 cwts., and \$54,102 for the previous year, showing an increase of 997 cwts. in the catch and \$38,092 in marketed value.

The increase in the catch is due to more bankers landing at North Sydney, as well as an increase in the catch for Ingonish, owing to more fishermen having engaged in this branch of the industry.

The largest landings were at North Sydney, Port Morien and Ingonish.

*Salmon (Commercial)*.—The total landed catch was 4,897 cwt., having a marketed value of \$78,436, as compared with 4,648 cwt., valued at \$76,720, for the preceding year, showing an increase of 249 cwt., in the catch and \$1,716 in marketed value.

These fish were unusually plentiful in the Mira river, and increases in the catch are noted in Grand river also. Salmon were fairly plentiful at Port Hood, Margaree, Cheticamp and bay St. Lawrence.

*Salmon (Sport)*.—The number of anglers visiting the Margaree river is increasing from year to year. It is most gratifying to report an increase of 379 salmon landed with the fly in the Margaree river, as compared with the previous year. Also, that these fish were of a larger size; one fish landed at Big Intervale, North East Margaree, weighed 52½ pounds. Fly fishing in the Margaree river was most satisfactory, except during a period from the middle of July to the middle of August when the water was very low, warm and clear. After the gale that occurred on the 24th of August, salmon ascended the Margaree river in enormous numbers, and most satisfactory catches were landed.

In the history of the Margaree the catch with the fly was eclipsed only in the banner season of 1922, when 868 fish were landed.

*Swordfish*.—The total catch was 5,376 cwt., valued at \$86,534, as compared with 6,594 cwt., valued at \$114,112 for the preceding year, showing a decrease of 1,218 cwt. in catch, and \$27,578 in marketed value.

The decrease is due to scarcity and unfavourable weather conditions, as these fish will only remain on the surface during bright and calm weather. Increases are noted at the ports of North Sydney and Ingonish, where more fishermen were engaged in this branch of the industry. Largest landings were at Louisburg, Glace Bay, and North Sydney.

*Herring*.—The catch was 26,604 cwt., having a marketed value of \$43,191 as against 35,641 cwt., having a value of \$83,005 showing a decrease of 9,037 cwt. in the catch, and a decrease of \$39,814 in marketed value.

The increase in the catch is due to the spring herring being exceptionally plentiful at Isle Madame, North Sydney and St. Ann's, and the decrease in the values is caused by a great falling off in the catch of the July run, as compared with the previous year.

*Smelts*.—The catch of smelts was 1,727 cwt., having a marketed value of \$26,427 as compared with 2,687 cwt. having a value of \$34,958 for the preceding year, showing a decrease of 960 cwt., in the catch, and \$8,531 in marketed value.

The great falling off in the catch is due to scarcity, and mild weather prevailing at the opening of the season.

*Oysters*.—The catch was 1,224 barrels, valued at \$10,347, as compared with 1,280 barrels, valued at \$9,502, for the preceding year, showing a decrease in the catch of 56 barrels and an increase of \$845 in the marketed value.

The largest catches were landed at Orangedale, River Dennys, and Little Narrows.

*Trout*.—Compared with the preceding year trout were far more plentiful, and as usual, excellent catches were taken at Lake Ainslie, River Dennys, Barachois and Indian Brook, St. Ann's. A trout landed with the fly at the outlet of Barachois river, St. Ann's, weighed 6 pounds 4 ounces. Many trout weighing over 5 pounds were landed in several of the streams of this island.

DISTRICT NO. 2.—COMPRISING THE COUNTIES OF HALIFAX, GUYSBORO, PICTOU, COLCHESTER, CUMBERLAND AND HANTS—INSPECTOR SUTHERLAND

The catch as well as the landed and marketed values show marked decreases compared with 1926, but the values compare favourably with those of 1925, although the catch is the lowest since 1923. This is due to smaller landings of all the principal varieties, excepting lobsters, hake, soles, mackerel and albacore. Cod and haddock show heavy decreases of 145,805 cwt. and 56,724 cwt., respectively, due chiefly to smaller landings at Canso and Halifax by steam trawlers. Only one trawler operated the full year at Canso, and fish were not found to be plentiful offshore. Another important reason for the smaller catch during the summer and autumn months was the unusually rough weather which greatly hampered the inshore operations. The only important increases are those of lobsters 2,529 cwt., soles 2,902 cwt., and albacore 686 cwt.

*Cod*.—The total catch was 212,876 cwt., with a marketed value of \$896,947 as compared with 360,681 cwt., with a marketed value of \$1,269,989 for 1926, showing a decrease of 147,805 cwt. in the catch, and \$373,042 in the marketed value.

Decreased catches were general throughout but are more pronounced at Halifax and Canso. A succession of gales during the summer and early autumn greatly hampered inshore operations and the fishermen were disheartened by unusually low prices. These opened at 1 cent per pound with only large fish wanted. However, as the season advanced, prices improved until 2½ cents to 3 cents were offered at the last of the season.

Of the total catch, 100,865 cwt. were taken offshore as compared with 227,698 cwt., taken offshore in 1926.

*Haddock*.—The catch was 191,934 cwt., having a marketed value of \$884,238, as compared with 249,719 cwt., having a market value of \$1,007,035 for 1926, showing a decrease of 57,785 cwt., with a corresponding decrease in the marketed value of \$122,797.

Guysboro county east is mostly responsible for the decrease, where only 53,619 cwt. were taken as compared with 1926—94,515 cwt. This is on account of only one trawler being operated in the summer and early autumn months. No haddock are taken by shore boats until November.

Of the total catch, 173,363 cwt. were taken offshore, as compared with 214,421 cwt. in the previous year. Prices to fishermen were about the same as for cod.

*Pollock.*—The catch was 8,180 cwt., having a marketed value of \$12,694, as compared with 19,401 cwt., having a marketed value of \$36,997, showing a decrease of 11,221 cwt. in the catch and \$24,303 in the marketed value.

The decline was most serious in Halifax county west and Guysboro county east, which is general for all line fish excepting hake during 1927.

Of the total catch, 5,399 cwt. were taken offshore, whilst 14,850 cwt. were taken offshore in 1926.

Prices to the fishermen were about 1 cent per pound, although for a period in the summer only 50 cents per cwt. was offered.

*Hake.*—The catch was 5,391 cwt., having a marketed value of \$12,955, as compared with 3,623 cwt., having a marketed value of \$8,535 for 1926, an increase of 1,768 cwt. and \$4,420 in marketed value.

The increase is due to increased catches in Antigonish county, Halifax west, and Guysboro east.

Offshore catch was 342 cwt. Prices landed, 75 cents per cwt. Market prices: dried \$4, green salted \$3, and smoked fillets 10 cents.

*Halibut.*—The catch was 7,240 cwt., having a marketed value of \$146,871, compared with 8,039 cwt., having a marketed value of \$164,462, a decrease in catch of 799 cwt. and value of \$17,591.

Smaller catches in Halifax west and Guysboro east account for the decrease. The offshore catch was 5,754 cwt., compared with 6,391 cwt. for 1926.

*Herring.*—The catch was 54,609 cwt., having a marketed value of \$146,784, compared with 68,984 cwt., having a marketed value of \$136,298, a decrease of 14,375 cwt. in the catch and an increase of \$10,486 in marketed value.

The catch of spring herring in Cumberland county north was a failure. Antigonish and Guysboro counties also show heavy declines, while in Halifax county west the catch increased 9,000 cwt.

*Mackerel.*—The catch was 34,003 cwt., having a marketed value of \$160,908, compared with 34,334 cwt., having a marketed value of \$149,231.

While the catch shows a decrease of 331 cwt., the marketed value shows an increase of \$11,677. This is due to better prices offered to the fishermen during the late run of mackerel in October and November.

Increased catches were taken in Guysboro County, while Halifax county is responsible for the decrease. During November fairly good catches were taken in Chedabucto bay and Halifax county west. Prices then were good and the fishermen did well. The fall run was unusually late; in fact, in Queensport Harbour all the nets were ashore and one fisherman who had been unable to take his nets ashore on account of sickness found a good catch when he was able to tend his gear, and the other fishermen soon had their nets out again.

Prices landed: May, 4 cents; June, 3 cents; July, 3 cents; August, 3 cents; September, 4 cents; October, 5 cents; and November, 6 cents per pound.

*Salmon.*—The catch was 5,886 cwt., having a marketed value of \$113,971, compared with 7,610 cwt., having a marketed value of \$149,695, a decrease in the catch of 1,724 cwt. and marketed value \$35,724.

Halifax county west alone shows a decrease of 1,968 cwt., Guysboro county shows a considerable increase, while in Antigonish the increase was 1,000 cwt., and in Pictou county 200 cwt. This fishery is in a flourishing condition in these two counties, the marketed value for 1927 being about \$65,000.

*Flounders, Skate, and Soles.*—Flounders and skate decreased 4,511 cwt. and 7,722 cwt., while soles increased 7,264 cwt. These fish are almost entirely produced offshore by steam trawlers.

*Catfish and Monkfish.*—1,972 cwt. less catfish were taken, and no monkfish for 1927, while 180 cwt. were landed last year. The entire catch of these varieties is produced offshore.

*Albacore.*—The catch was 1,575 cwt., with a marketed value of \$15,750, compared with 889 cwt., having a marketed value of \$8,890 for 1926.

These fish were fairly plentiful during July in St. Margaret's bay, where the entire catch was taken.

*Swordfish.*—The catch was 1,715 cwt., with a marketed value of \$30,795, as compared with 6,176 cwt., with a marketed value of \$90,694 for 1926, showing a decrease in catch of 4,461 cwt. and marketed value \$59,899.

Guysboro county is responsible for the decrease, particularly the eastern part, where the decline was 2,176 cwt. Prices for ground fish were low during the swordfish run, and fishermen generally lost a lot of time and went to great expense in endeavouring to capture swordfish. It is usually the case that fishermen give up regular fishing when swordfish are on, and unless the fish are plentiful their efforts usually result in a loss.

#### DISTRICT NO. 3.—COMPRISING THE COUNTIES OF LUNENBURG, QUEENS, SHELburne, YARMOUTH, DIGBY, ANNAPOLIS, AND KINGS—INSPECTOR MARSHALL

*Cod.*—The greatest fall-off was in connection with the catch and value of the Lunenburg cod fishing fleet. This of course would have a tendency to decrease the quantity and the total value of the catch.

*Haddock.*—The catch and value of haddock remains about the same as the last few years, showing a slight decrease from last year.

*Hake and Cusk.*—This fishery shows an increase over last year and a considerable increase over previous years.

*Halibut.*—The halibut fishery shows a large increase both in catch and value.

*Herring.*—The catch of herring was 133,347 cwt., with a value of \$276,047, as compared with a catch of 160,198 cwt. valued at \$328,245 for 1926. The year 1926 was one of the best years the herring fishermen have had for some time.

*Mackerel.*—The mackerel fishery in so far as this district is concerned remains in a more or less depleted condition.

*Salmon.*—The salmon fishery is gradually on the increase; 2,036 cwt. were taken with a value of \$40,782, which compares very favourably with the catch and value for the last five years.

*Scallops.*—During the year 1927, 37,579 barrels of scallops were taken in this district with a value of \$212,698. This fishery is showing a steady and continued increase from year to year, especially in the Bay of Fundy district.

#### THE LUNENBURG FLEET

The total value of the season's catch was approximately \$1,500,000 and the total catch was 227,590 quintals, or 115,140 quintals short of the previous year's catch. The schooner *Gladys Mosher*, Captain John Mosher, was the high liner of the fleet with 4,540 quintals.

The estimated monetary value of the shortage of the catch of the Lunenburg fleet this year in comparison with last year is \$300,000 and the shortage of last year from the year before was around \$100,000. Therefore the loss to the industry in the past two years is about \$400,000.

These figures do not include the loss of vessels, etc., which for the past two years has been appalling. Four staunch vessels of the Lunenburg fleet were lost in the big gale of August 24. Their entire crews, numbering over eighty men, also perished. The vessels lost were the *Uda R. Corkum*, Captain Wilfred Andrews; *Malaha*, Captain Warren Knickle; *Joyce M. Smith*, Captain Edward Maxner; *Clayton W. Walters*, Captain Mars Selig.

The cost of vessels and equipment together with running expenses was high, and therefore money was not readily obtainable, and the industry was not expanded as it should have otherwise been.

The number of vessels engaged in fishing in 1927, including those lost, was eighty-three, nine less than in the previous year. Two new vessels were completed to be added next year to the fleet, but then it must be remembered there were four vessels lost during 1927, so that the fleet in 1928 will no doubt be smaller than in 1927. Each year shows an increased number of Newfoundland men manning the Lunenburg fleet. One of the vessels lost this year, the *Joyce M. Smith*, had with the exception of the captain and two men an entire crew of Newfoundland men.

Fifty-eight vessels on the frozen bait trip landed 30,700 quintals; seventy vessels on the spring trip landed 60,390 quintals; and seventy-nine vessels on the summer trip landed 136,500 quintals.

The prices received this year were slightly in advance of those received last year. In 1926 the fishermen received from \$5.50 to \$6 for their first two trips, and \$5.50 for their summer trip. This year the frozen bait trip brought around \$6.35 per quintal, the spring trip was sold at \$5.80 to \$6.40, and the summer catch around \$7.

#### BAIT AND ICE REPORTING SERVICE

For the benefit of the fishermen of Nova Scotia and others immediately interested in the fishing industry it was decided to resume reporting, during the spring, ice conditions and bait supplies at the Magdalen islands. The fishery officer at Grindstone, Magdalen islands, was instructed to forward a telegram once per week until bait appeared, after which to send one every day, except Sunday, until the end of the spring herring season. The information received was of particular value to those interested, especially at such fishing centres as Lunenburg, Riverport, and Canso.

The first report was received on April 22, and dealt with ice conditions, as no herring had as yet appeared. Herring were reported on May 13, and from that time on reports were received regularly until the end of the spring run, around the second week in June. This service was much appreciated by the fleet engaged on the banks.

The contents of the reports as received were posted prominently in the chief fishing centres and given publicity in the Halifax papers.

#### THE STEAM TRAWLER

Owing to the increased demand and expanding market for fresh fish, the steam trawler fleet was augmented by two vessels, viz., the *Bonthorpe* and the *Sleaford*. Both the *Bonthorpe* and the *Sleaford* came to the Maritime Fish Corporation, Ltd., and operated from Canso. The *Bonthorpe* was constructed at Collingwood, Canada, in 1927, and the *Sleaford* at Selby, England, during the same year. Each vessel operated from Nova Scotia for a period of approximately three months.

Each year shows an increase in the number of steam trawlers employed from Nova Scotia ports. During 1926 eleven were in operation, while 1927 saw fourteen engaged. They were as follows:—

Name of Vessel	Port Operated From
<i>Offa</i> .....	Canso, N.S.
<i>Rayon D'Or</i> .....	Canso, N.S.
<i>Lemberg</i> .....	Halifax, N.S.
<i>Venosta</i> .....	Halifax, N.S.
<i>Good Hope</i> .....	Halifax, N.S.
<i>Loubyrne</i> .....	Halifax, N.S.
<i>Lord Beaconsfield</i> .....	Canso, N.S.
<i>Lord Darling</i> .....	Canso, N.S.
<i>Lord Shaftesbury</i> .....	Canso, N.S.
<i>Viernoe</i> .....	Halifax, N.S.
<i>Willoughby</i> .....	Halifax, N.S.
<i>Bonthorpe</i> .....	Canso, N.S.
<i>Sleaford</i> .....	Canso, N.S.
<i>Cape Agulahu</i> .....	Halifax, N.S.

#### HAIR SEAL MENACE

The hair seals in this province have been in the past, and still are, very destructive to the commercial fisheries, especially the salmon and smelt fisheries. This matter has been of considerable concern to the department, and various means and ways of destroying the seals have been attempted without a great deal of success until the present year.

Some years ago a bounty of \$1 per seal was offered, but it was claimed that this amount was inadequate. The decision of the department this year to pay a bounty of \$3.50 for each hair seal destroyed has resulted in the destruction of a considerable number of the species, which has naturally had a beneficial effect on the commercial fisheries of the province.

The new bounty went into operation in April, and up to the last of the present calendar year 2,754 seals have been turned in and their snouts delivered to officers of the department throughout the province.

It is estimated that at the close of the fiscal year March 31, 1928, some 3,300 seals will have been destroyed and turned in.

The continuation of this bounty next year should result in the destruction of a considerably increased number of seals.

#### SCHOOL OF INSTRUCTION FOR INSPECTORS AND FISHERY OFFICERS

A school of instruction for inspectors and fishery officers was conducted by the Biological Board of Canada at the Atlantic Experimental Station, Halifax, N.S., from February 14 to 26 inclusive. Three district inspectors of this province were in attendance as well as sixteen fishery overseers from Nova Scotia, together with a number of inspectors and overseers from the provinces of New Brunswick and Prince Edward Island. The various subjects taken up during the course aroused considerable interest and resulted in a very beneficial effect upon all those in attendance. Many subjects were dealt with and the time engaged was well spent. All the officers attending were alert, active and very much interested in the various phases of the industry covered by the lectures and classes of instruction.

#### FISH COLLECTION SERVICE

On that portion of the Guysboro county coast between Canso and Port Bickerton an experiment was tried out in the collection of fish by Government subsidized boats, which carried the fish to Canso for delivery to the dealers at a nominal rate of freight.

Two boats were first engaged but owing to rough weather and the difficulty of securing ice supplies, a third boat was later engaged to assist. These boats plied between Canso and Port Bickerton, calling at all points where fish were offered, carrying ice and bait from Canso to the fishermen and bringing their catches back to Canso. The service was highly satisfactory in spite of unusually rough and foggy weather, and the fishermen for the first time were able to dispose of their catches fresh for better cash prices. They were assured of a regular supply of bait and relieved of the work of splitting their catches which enabled them to remain longer on the fishing grounds. Later fishing was also encouraged which requires larger boats, these, the fishermen will probably arrange for if the service is continued.

A total of 2,832,325 pounds of fish were carried by the collection boats at a cost to the public which, apparently, quite justifies the continuation of the service.

#### RIVER AND INLAND FISHERIES

Sport fishing is a distinct asset to the province and is becoming more so as the influx of tourists steadily increases from year to year. Good catches of salmon and trout were taken by anglers throughout the whole province. The rainfall during the summer was exceptionally heavy and provided many periods of high water conditions which enabled salmon to ascend the numerous rivers and streams.

Many salmon were taken on the fly on the various rivers and streams in Halifax and Guysboro counties. The St. Mary's river, Guysboro county, is an exceptionally good river and salmon sport fishermen are visiting it more and more every year. This year they were quite successful in their operations. Most of the rivers in the above counties flow through country which is unsuitable for agriculture, and while some deforestation has taken place, the low temperature and volume of the streams have been maintained so that they make ideal salmon waters.

Anglers for salmon were exceptionally successful in such rivers as the St. Mary's river, Guysboro county, the Margaree river in Inverness county, the Medway river and the Mersey river in Queens county, the Annapolis river, Annapolis county, and various other rivers and streams throughout the province. The record salmon taken by an angler was caught on the Margaree river and weighed 52½ pounds.

Trout fishing was particularly good. In Cape Breton island as well as the mainland excellent catches were taken. A trout landed with the fly at the outlet of Barachois river, St. Ann's weighed six pounds four ounces. Nova Scotia should be and is, becoming a popular and prosperous sport fishing district.

While the average visitor is contented with fishing for trout a great many visitors came to angle for salmon.

A great deal of time and energy was expended in an effort to keep our rivers and streams free of obstructions, etc., in order that such fish as salmon and trout may readily ascend to their spawning grounds, as it is recognized by all interested that it is of vital concern to the province that these fisheries be kept up if we are to hold the reputation which Nova Scotia possesses at present as a sporting country. Fishways were constructed in dams and various obstructions removed from the rivers and streams. Both salmon and trout fry were planted in the various waters.

## UTILIZATION OF FISH WASTE MANUFACTURE OF BY-PRODUCTS

During the year four licensed reduction plants were operated in Eastern Nova Scotia as shown below:—

Fasterfat, Ltd., Halifax.

C. W. Kendall Reduction Works and Fish Meal Plant, Halifax.

Lucky Fish Meal Co., Halifax.

Robinson Glue Co., Canso.

Fasterfat, Ltd. installed a modern machine for the manufacture of fish meal and has been working steadily throughout the year.

C. W. Kendall plant has been working part time on a smaller scale than Fasterfat.

The Lucky Fish Meal Co. was formed in February, absorbing the Kendall plant but only operated a short time when it became disorganized and Mr. Kendall resumed his own operations.

The Robinson Glue Co. operated as usual throughout the year.

The following plants were also operated in Western Nova Scotia:—

H. R. L. Bill, Lockeport, N.S.

A. W. Dodd Co., Tiverton.

A. W. Dodd Co., Westport.

Liverpool Refiners, Liverpool (east side).

Roy Casey, Victoria Beach.

Parkhurst Cod Liver Oil Corp., Tiverton.

M. A. Nickerson, Clark's Harbour.

George W. Wightmen, Lockeport.

Lewis Canning Co., Annapolis.

All of the above were engaged in the production of oil with the exception of the Lewis Canning Co. This plant was operated from a by-product standpoint for the purpose of grinding scallop and clam shells into chicken food.

## ROYAL COMMISSION ON FISHERIES

A Royal Commission to investigate the fisheries of the Maritime Provinces and the Magdalen Islands was appointed by Order in Council in September. This commission held meetings in Nova Scotia during the months of October, November and December. Sittings were held at Cheticamp, Port Hood, Canso, Isaac's Harbour, Arichat, St. Peters, Ingonish, North Sydney, Louisburg, Glace Bay, Mulgrave, Antigonish, Pictou, Pugwash, Halifax, Lunenburg, Liverpool, Lockeport, Shelburne, Barrington Passage, Clark's Harbour, Yarmouth and Digby.

The sittings were largely attended by the fishermen and others interested in the fishery industry.

## FISHERIES PATROL SERVICE

Patrol boat *Mildred McColl*, Captain Williams.—The Fisheries Patrol Boat *Mildred McColl* was absent from the district during the great part of the fishing season on scallop investigation in Prince Edward Island and New Brunswick. Her absence resulted in an outbreak of illegal lobster fishing, particularly in Halifax county east. This section of the coast includes numerous islands and coves which provide good cover for illegal operations. These can only be properly protected by the constant attention of the patrol boat.

Contract boat *Lulu T* was chartered to protect the lobster fishing boundary at Port Philip, Cumberland county, from August to October. The protection was only fairly satisfactory, but it will never be adequate until a regular boat is provided.

*F.P. I*, Captain Baker.—This boat kept up a continuous patrol throughout the season between Pubnico and the head of the Bay of Fundy and gave entire satisfaction in so far as it was possible for one boat to do so. This district is largely frequented by tourists during the summer months who in many cases encourage people to illegally fish for lobsters. The inspector for the district states he does not believe the parties carrying on such illegal fishing are our real fishermen but that they are farmers and men who are not dependent on that fishery for an existence. In practically every case where men were convicted for illegal fishing they were not lobster fishermen but parties engaged in other lines of endeavour. Another boat should be put on in the Yarmouth district to assist in patrol work covered by *F.P. I*, as this district is altogether too large for one boat, if the fisheries are to receive adequate protection.

## FISHERIES CRUISER SERVICE

The past year was a strenuous one for both C.G.S. *Arras* and C.G.S. *Arleux*. Both vessels were actively engaged throughout the year and both Captain Barkhouse of the *Arras* and Captain Cousins of the *Arleux* deserve commendation for the zeal and vigilance which characterized their work.

The *Arras* was engaged during the summer months as a hospital ship with the fleet on the Grand Banks and during the remainder of the year was occupied in patrolling the coast and ice breaking. The *Arleux* performed extremely valuable work throughout the year on fisheries patrol service and in assisting vessels in distress, breaking ice, etc.

With regard to the work of the *Arras* as a hospital ship the medical officer employed on the vessel reports as follows:—

The total number of new cases treated was 223, an increase of 37 over the preceding year.

The total number of calls upon the ship's medical officer for treatment, supplies and dressings were 312.

A larger quantity of stock drugs was dispensed but not so much of the special medicines.

The instruments were all oiled and placed in the sterilizer which with the remaining drugs and supplies were left in the care of the commander of the ship.

I believe more and more the fishing fleet are regarding the government ships as an intimate and integral part of their equipment. They trust us more with regard to their catches, each year increasing calls are being made upon our services and I can only emphasize again the advisability of sending a more suitable ship to the Grand Bank's service, a ship equipped with some form of hospital and surgical accommodation, a motor boat for getting quickly around the fleet in harbours, and facilities for exchanging courtesies between the government ships of foreign countries which we encounter in our work.

A digest of the logs of these two vessels will reveal the nature of the work performed and show an outstanding record of efficiency.

*Cruiser "Arras"—Captain Barkhouse*

The *Arras* commissioned at Yarmouth on April 1, 1927, was at that date undergoing her annual refit, the work being completed on April 20.

April 20. Proceeded to sea cruising east, called at Shelburne and arrived at Liverpool the 21st.

April 25. Left Liverpool cruising east and arriving at Halifax.

April 26. Taking stores and painting ship.

April 27. Proceeded to adjust ship's compasses.

April 29. Left Halifax cruising west, called at Lunenburg, and arrived at Liverpool the 30th.

May 2 and 3. Searching for drifting buoy off Little Hope and Roseway bank.

May 4. Cruising west, arriving at Shelburne same day.

May 5. Left Shelburne cruising east, calling at Lockeport and Lunenburg, arriving at Liverpool, May 6.

May 7. Assisted the 4-mast schooner *Joan Kielberg* out over Liverpool Bar to sea.

May 9. Assisted the 4-mast schooner *Cashier* to wharf at Brooklyn, then searched and found drifting bell buoy 18 miles off Liverpool. Towed buoy in and delivered to the C.G.S. *Lady Laurier*.

May 10. Cruising east arriving at Lunenburg same day.

May 11. Cruising west arriving at Liverpool.

May 12. Assisted the 4-mast schooner *Cashier* from wharf at Brooklyn to McClearns wharf, Liverpool.

May 13 to 16. At Liverpool. Dense fog on coast.

May 17. Assisted the 3-mast schooner *Cape LaHave* out over Liverpool Bar to sea.

May 18. Cruising west calling at Lockeport and arriving at Shelburne the 19th.

May 20. Cruising east. Assisted the salt laden 3-mast schooner *General Pau* to sea from Sandy point. Arrived at Liverpool same day.

May 21. Assisted the 4-mast schooner *Cashier* out over Liverpool Bar to sea.

May 23. Proceeded on patrol duty. First American mackerel seiner arrived on coast, followed her to Liverpool.

May 24 and 25. At Liverpool. Dense fog on coast.

May 25. First mackerel taken in nets on coast. These were taken at Yarmouth and Dover, N.S.

May 26. Calibrating the Direction Finding Station at Yarmouth, N.S.

May 28. Cruising east watching American mackerel seiners, arriving at Lunenburg the 30th with two mackerel seiners.

June 1 and 2. With American seiners. Arrived at Liverpool, June 2.

June 3. Cruising east, arriving at Halifax, June 4.

June 5 and 6. At Halifax taking in stores and new chain cable.

June 7. Cruising west calling at Lunenburg and Liverpool, arriving at Yarmouth, June 10.

June 11. Cruising east calling at Shelburne, arriving at Liverpool the 12th.

June 13. Hauled ship out on Marine Railway at Liverpool for overhaul underwater fittings and painting bottom.

June 16. Launched ship off Marine Railway and to wharf at Liverpool.

June 17. Cruising east, called at Lunenburg and arrived at Halifax on June 18.

June 19 to 22. At Halifax taking stores and getting ready to proceed to Newfoundland waters with the Canadian fishing fleet.

June 23. Cruising east towards banks.

June 24. At North Sydney. Coaled ship and proceeded at midnight towards St. Pierre and Green banks.

June 26. Arrived at Cape Broyle, Newfoundland, with part of the fishing fleet, to get in touch with the fleet on banks.

June 27 to August 30. The ship was in close touch with the fishing fleet on banks and in harbours when seeking bait, giving medical treatment to all sick fishermen and taking very serious cases to hospital at St. John's for treatment. During the season we gave treatment to 223 men on the vessels.

August 30. All fishing vessels were leaving for the western banks and towards home. We followed the fleet and arrived at North Sydney, 5.20 p.m. the 31st.

September 1. Proceeding towards Sable Island banks to search for four missing Lunenburg fishing vessels. Called at Canso and interviewed all fishing vessels sighted on banks and coast.

September 10. Arrived at Liverpool and Lunenburg to interview fishing captains that had returned from Sable Island banks.

September 12. Cruised towards Sable Island banks searching for missing fishing vessels.

September 14. Found the Grenfel Mission yacht *Maraval* at sea 22 miles off Canso, towed her to Canso and gave her in charge of customs officer.

September 16. Arrived at Lunenburg to embark six Lunenburg fishing captains and take them to Sable island to try and identify the wreckage found on island.

September 17. Proceeded and arrived at Sable island 9 a.m. the 18th. The six captains landed and remained six hours searching over the beach and around shores on the island. At 3 p.m. captains returned and we proceeded towards Lunenburg.

September 19. Arrived at Halifax to land sick lightkeeper from Sable island. Left Halifax and arrived at Lunenburg same day.

September 20 to 22. At Lunenburg. Dense fog on coast and banks.

September 23. Proceeded towards Sable Island banks searching for wreckage.

September 25. At 6.30 a.m. we found the Lunenburg schooner *Uda R. Corkum* sunk in 15 fathoms water on Middle bank. We pulled the topmast, main gaff and main boom and part of mainsail from the wreck and took into Lunenburg.

September 27. Arrived at Lunenburg and gave wreckage in charge of the customs officer.

September 28 and 29. At Bridgewater.

September 30. Proceeded to assist schooner *Manuata*, ashore at Gaff point, mouth of LaHave river.

October 1. Pulled schooner *Manuata* off rocks. Vessel filled with water and turned over on side. Towed her in river.

October 2. At Liverpool.

October 3 and 4. At LaHave assisting with sunken schooner *Manuata* to get her out of channel clear of shipping.

October 5 to 8. Cruising on western coast watching American mackerel seiners. Three seiners on our coast.

October 9. Attended memorial service for lost fishermen at Lunenburg. Arrived at Liverpool same day.

October 10 to 20. Ship at Liverpool blowing down and cleaning boiler and tanks.

October 21. Proceeded cruising east towards North Bay and the Northumberland Straits. Called at Lunenburg, Halifax, White Head, Port Hawkesbury, Souris, Prince Edward Island, arriving at Pictou October 29.

October 31. Left Pictou cruising towards south coast of Nova Scotia. Called at Souris, Canso, White Head, arriving at Halifax, November 3.

November 5. Cruising on western coast and at Liverpool, November 11.

November 12. Proceeded on station and arrived at Lunenburg to help pull new fishing schooner from launchways where she had broken down 11.10 p.m. Pulled schooner clear of launchways.

November 13. Cruising on western station.

November 16. Found the American fishing schooner *Virginia* in distress off Little Hope and towed her to Liverpool for repairs.

November 17. Cruising on station, calling at Lunenburg, Lockeport, and Shelburne.

November 23. Found mast showing 6 feet out of water and fast to sunken wreck off Mouton island. We pulled mast from wreck and towed to Liverpool and gave in charge of customs officer.

November 24. Cruising on station.

November 30. Assisted schooner *Vivian P. Smith* to wharf at Shelburne.

December 2. Cruising on station. Found Shelburne fishing schooner *Muir* in distress with broken shaft and assisted her to Marine Railway at Liverpool.

December 3. Cruising on western station.

December 17. Towed schooner *Hazel L. Myra* out of mud to safe berth at West LaHave, then cleared ice from LaHave river up to Bridgewater and assisted three-mast schooner *Harry McLellan* out the river to safe anchorage off West LaHave.

December 18. Assisted three-mast schooner *Hazel L. Myra* from LaHave to Lunenburg and arrived at Liverpool same day.

December 19 and 20. Assisted local tugs to pull the American fishing schooner off Liverpool bar, but failed, and vessel wrecked.

December 21. Cruising on station. Called at Lunenburg and assisted three-mast schooner *Hazel L. Myra* to Halifax. Then arranged to take doctor to Sable island to attend sick lightkeeper. Doctor Byrne refused to go in *Arras* as the accommodation did not suit him.

December 22. Cruising west towards LaHave river to clear ice and keep river open for shipping.

December 23. Broke ice and assisted the American four-mast schooner *Dustin G. Cressey* down river to safe anchorage off LaHave.

December 24. Cruising on station.

December 25 and 26. At Liverpool.

December 27. Cruising on western station, calling at Lunenburg, Liverpool, and Shelburne.

January 6. Assisted National Defence lighter *Sapper* from Shelburne to Halifax.

January 7 to 9. At Halifax taking stores.

January 10. Cruising on station between Halifax and Shelburne.

January 12. Assisted fishing schooners *Agnes McGlashen*, *Mona Maria*, and *Clara B. Creaser* along the coast from Sambro to LaHave.

January 13. Cruising on western station and arrived Halifax.

January 16. Assisting fishing vessels.

January 18. Assisting fishing schooners *Hamona* and *Delawana* from Sambro light to LaHave and Lunenburg.

January 19. Breaking ice in LaHave river and assisting schooners *Evelyn Wilkie* and *Kathleen Creaser* into safe berth clear of ice.

January 21. Breaking ice and clearing channel to Bridgewater and assisting four-mast schooner *Joan Kielberg* from wharf at Bridgewater down river through ice to safe berth off West LaHave.

January 22. At Liverpool.

January 23. Cruising east, arriving at Halifax same day.

January 24. Proceeded, assisting fishing schooners *Pauline Lhones* and *Democracy* from Sambro to Lunenburg and Riverport.

January 27. Arrived West LaHave.

January 28. Pulled the schooners *Golden West II* and *Village Queen* off the mud banks at Parks Cove, where they had been driven on shore during the gale of the 25th.

January 30. Cruising on station and searching for drifting light and bell buoy which had gone adrift from Brazil rock, 11.55 p.m. Found buoy 15 miles south by west from Little Hope. Took buoy in tow and arrived at Sandy point

5 a.m. 31st. We then started breaking ice and clearing ice from channel at Shelburne.

February 1. Proceeded breaking ice at Shelburne, found the can buoy off Sandy point light drifting to sea, towed it back to position, then proceeded breaking ice.

February 2. Cruised east and arrived at Riverport. Breaking ice and assisting fishing vessels at Riverport.

February 3. Breaking ice at LaHave, Parks Cove, and Riverport. Cleared channel to Ritcey's wharf and released fishing steamer.

February 4. Breaking ice at Riverport, released schooners *Mary Pauline* and *Audry Brown* from ice to safe anchorage.

February 5. Cruised to Mahone bay and started breaking ice to clear channel to shipyards at Mahone.

February 6. Breaking ice at Mahone bay and Lunenburg.

February 7. Breaking ice at Mahone, Lunenburg, and Riverport. We released four-mast schooner *Joan Kielberg* from ice to berth off Spectacle island clear of running ice, then cruised west, arriving at Shelburne February 8.

February 9. Cruising east, called at Liverpool and arrived at Lunenburg the 10th.

February 11. Cruised to Mahone bay, cleared channel of ice and arrived at Liverpool same day.

February 13. Cruised east, breaking ice at Riverport and Parks cove. Released schooner *Versailles* from ice and assisted her to Lunenburg.

February 14. Cruised to Mahone bay, broke ice, cleared channel to shipyards and returned to Lunenburg same day.

February 15 and 16. At Lunenburg.

February 17. Cruising west, calling at Liverpool and arriving at Shelburne the 22nd.

February 23. Pulled the stranded yacht *Mic-Mac* off ledge and to wharf clear of ice.

February 24. Cruised east and anchored off LaHave river at night, waiting for high tide.

February 25. Proceeded, breaking ice at Riverport, Parks cove, and LaHave, arriving at Liverpool same day.

February 27. Cruised east, breaking ice at Riverport and Parks cove. Released fishing schooner *Jennie Elizabeth* from ice and assisted her to Lunenburg.

February 28. Cruised to shipyards, broke ice and cleared the channel so new fishing schooner could be launched, then proceeded to Riverport, breaking ice and clearing channel. Released fishing schooner *Bertha Walters* from ice and to LaHave.

February 29. Proceeded breaking ice at Riverport. Released schooner *Hamona* from ice and to wharf at Riverport. Assisted fishing schooner to Lunenburg, then assisted schooner *D. D. McKenzie* from Lunenburg to ice channel, Mahone bay. Broke ice to wharf and shipyards and assisted *McKenzie* to Ernest wharf, Mahone.

March 1. Proceeded breaking ice at Mahone, then cruised west to Riverport, breaking ice and clearing channel. Released fishing schooners *Mona Maria* and *Clara B. Creaser* from ice and to wharf at Riverport.

March 2. Breaking ice at Parks cove and Riverport. Released the fishing schooners *Agnes G. Myra* and *Mark Grey* from ice and to wharf at Riverport. Released fishing schooner *Hermada* from ice at Parks cove and released fishing schooner *Neva Belle* from ice to wharf at Indian Point, then breaking ice at Mahone bay.

March 3. Proceeded breaking ice Mahone. Towed schooner *D. D. McKenzie* out ice channel clear of running ice, then cruised to Parks cove breaking ice. Released fishing schooner *J. E. Conrad* from ice to wharf at LaHave. Arrived at Liverpool same day.

March 4 and 5. At Liverpool. Gales on coast.

March 6. Proceeded, assisted schooner *Cape Blomidon* out Liverpool bay clear of ice, and to sea. Cruised east, breaking ice at Riverport and Parks cove, arriving at Mahone bay same night.

March 7. Proceeded breaking ice at Mahone bay. Assisted schooner *D. D. McKenzie* to sea, then cruised to Riverport breaking ice and clearing channel so coastal steamer with frozen bait could get to Ritcey's wharf to supply fishing vessels. At LaHave at night.

March 8. Proceeded breaking ice at Riverport. Released fishing schooners *Mary Pauline* and *Pauline Lohnes* and to wharf, then proceeded to Parks cove. Released fishing schooner *Bernice Zinck* from ice and assisted her to Lunenburg.

March 9. Proceeded to Indian Point breaking ice. Released schooner *Neva Belle* and assisted her to Lunenburg, then proceeded to Riverport, Parks cove and LaHave breaking ice. Released fishing schooner *J. E. Conrad* and assisted her to Lunenburg, then proceeded to Parks cove and LaHave.

March 10. Proceeded to Riverport breaking ice. Released the fishing schooners *Mark Grey*, *Mona Maria*, *Agnes G. Myra* and *Clara B. Creaser* from wharf and out in harbour clear of ice. Released schooner *Russel Zinck* from ice, then proceeded to Mahone bay breaking ice and clearing channel.

March 11. Breaking ice at Mahone bay.

March 12. Proceeded breaking ice at Mahone. Released fishing schooner *A. J. Balfour* from ice and assisted her to Lunenburg.

March 13. At Lunenburg.

March 14. Proceeded to Mahone bay breaking ice and clearing the channel to shipyards.

March 15. Breaking ice. New pilot boat launched, then proceeded to Indian Point breaking ice and clearing channel, arriving at Lunenburg same night.

March 16. Proceeded to East LaHave breaking ice and clearing channel to wharf, then breaking ice in LaHave river.

March 17. Proceeded breaking ice and opening up LaHave river for shipping. Cleared channel to shipyards at Dayspring and channel to Bridgewater, then cruised west arriving at Liverpool same night.

March 18, 19 and 20. At Liverpool. Heavy gales on coast.

March 21. Proceeded to sea cruising towards Yarmouth for ship to lay up for repairs as per telegram received from department. Arrived at Yarmouth same night.

March 22. Moored ship at Baker's wharf for refit.

March 23. Inspectors O'Brien and Stevens on board going over the defects that require attention.

March 24. Crew getting ship ready for repairs.

The Lunenburg Grand Banks fishing fleet consisted of 68 sail, French fishing fleet 150 sail, Newfoundland fleet 27 sail, and Portuguese fleet 20 sail.

Forty-two French beam trawlers, two Spanish trawlers and nine Canadian beam trawlers were sighted this year on the banks, that is, St. Pierre, Quero and Middle Ground banks. We had no beam trawlers to contend with on the Grand banks this year.

The Lunenburg fleet had only a fair catch this year. During the first part of August fish were very scarce on the Grand banks which caused quite a number of our vessels going west to the Sable island and Middle Ground banks.

We had no complaints of interference with our fleet by the beam trawlers, and very few reports of illegal fishing.

During the year we had 16 American fishing vessels on the stations we were working on, these we boarded twenty-four times.

During the year we steamed 15,293 miles and consumed 1,285 tons of coal.

*Cruiser "Arleux"—Captain Cousins*

April 1. Cruising westward towards Liverpool on patrol work. Fishing reported poor.

April 2. Arrived at Shelburne.

April 4. Proceeded to Yarmouth. Boarded several American lobster buyers. Local fishing vessels report fair catches being taken.

April 5. Proceeded up Bay of Fundy to Digby. Passed large fleet of lobster fishing boats between Yarmouth and cape St. Mary's. Fishermen report fishing very good, between Gulliver's cove and Digby gut passed large fleet of scallop boats operating. Fishermen report good scallop fishing.

April 11. Proceeding towards Browns bank to take up search for twelve men adrift in four dories from the American fishing schooner *Commonwealth* burned at sea.

April 12. Searching Browns and LaHave banks for missing fishermen. Spoke with several fishing vessels on banks. No trace of missing men in dories. Continued search until midnight when weather prevented any further search then proceeded towards coast.

April 14. Arrived at Shelburne.

April 15. Proceeded to Halifax.

April 20. Proceeded to Lunenburg.

April 21. Moored ship at Lunenburg for annual repairs.

June 10. Finished repairs.

June 11. Proceeded to Halifax for bunker coal and supplies.

June 17. Proceeded on patrol work, arriving at Lunenburg.

June 19. Proceeded to LaHave banks in search of two missing fishermen from the Liverpool fishing schooner.

June 20. Continued search towards cape Sable. 7.30 p.m. arrived at Shelburne. Reported fishermen picked up and landed at Portland, Maine.

June 24. Proceeded to Halifax for supplies.

June 29. Arrived at Canso.

July 1. At Canso taking part in Diamond Jubilee celebration.

July 4. Arrived at Sheet harbour.

July 5. Proceeded to Halifax.

July 9. Proceeded to Lunenburg.

July 12. Proceeded to Chester.

July 13. Patrolling in Mahone bay in search of illegal lobster fishing.

July 15. Patrolling in St. Margaret's bay, arriving at Halifax.

July 18. Proceeded to sea, took crew off schooner *Mary F. Anderson* and towed derelict to Halifax.

July 26. Patrolling off Halifax harbour in search of illegal lobster fishing.

July 27. Proceeded to Chester.

July 29. Arrived at Lunenburg.

July 30. Proceeded to Liverpool. Fishing reported fair.

August 2. Arrived at Shelburne. Local fishing boats taking herring.

August 3. Proceeded to Yarmouth. Boarded the American fishing schooner *Yankee*.

August 4. Calibrating the Yarmouth D. F. Station.

August 5. Calibrating station.

August 6. Proceeded to Bay of Fundy towards Digby.

August 10. Located new scallop bed 14 miles N.N.W. from Point Prim, Digby.

August 12. Proceeded to Yarmouth.

August 13. Arrived at Shelburne. Boarded American fishing schooner *Oretha F. Spinney*.

August 16. Patrolling 3 mile limit off Shelburne to prevent American fishing vessels from securing bait inside limits. Local fishing boats taking good catches of herring from nets, disposing their catches to the Shelburne cold storage.

August 17. Patrolling off Shelburne.

August 18. Proceeding towards Halifax for coal and supplies.

August 20. Relieved lightship No. 24 off Halifax. 8 p.m. relieved by lightship and proceeded to Halifax.

August 26. Arrived at Shelburne.

August 27. Patrolling off Shelburne, boarded several American sword-fishermen at Shelburne.

August 30. Patrolling in vicinity of Shelburne.

September 1 to September 3. At Shelburne. Thick fog. Boarded several American fishing vessels.

September 5. At Lockeport (Labour Day) taking part in celebration.

September 6. Proceeded to Sandy point, took schooner *Joan Kielberg*, which was damaged in gale August 24, in tow for LaHave river.

September 7. Moored schooner at LaHave river, and proceeded to Lunenburg.

September 8. Cruising towards Halifax.

September 13. Proceeded to St. Margaret's bay and Hubbards cove, and proceeded to Lunenburg.

September 15. Proceeded in search of illegal lobster fishing.

September 16. Arrived at Shelburne. Boarded several American fishing vessels.

September 17. Arrived at Halifax.

September 19 to September 24. Cruising in vicinity of Halifax.

September 26. Cruising towards St. Margaret's Bay and Hubbards Cove. Proceeded to Halifax.

September 28. Arrived at Lunenburg.

September 29. Proceeding towards Sable island to bring off the late light-keeper's family and sick man.

September 30 to October 2. Off Sable island. Crew of life saving station made several attempts to launch surf boat, sea too rough.

October 3. Proceeded for coal. Towed into Canso water logged schooner *N. W. White*. Proceeded towards Sable island.

October 4. Arrived at Sable island. took off Cleary family and sick man, proceeded towards Halifax. Strong S.W. gale.

October 5. Arrived at Halifax.

October 6. Proceeded to St. Margaret's bay and Hubbards cove.

October 7. Proceeded to S.W. island, assisting patrol boat *Mildred McColl* in locating position of fish trap. Proceeded to Lunenburg.

October 9. At Lunenburg. Officers and crew attending memorial service for the fishermen lost during the gale of August 24th.

October 10. Proceeded to Halifax and vicinity.

October 15. Arrived at Lunenburg.

October 17. Proceeded in search of illegal lobster fishing.

October 18. Boarded American seiner *Governor Foss*, at Lunenburg.

October 21. Arrived at Halifax, cleaning ship's boiler.

November 1. Proceeded to Lunenburg.

November 2 and 3. Proceeded in search of illegal lobster fishing, proceeding to Lunenburg.

November 8. Arrived at Shelburne.

November 9. Cruising towards Yarmouth.

November 10. Calibrating Yarmouth D. F. Station.

November 11. Proceeding up Bay of Fundy towards Digby, passed large fleet of scallop boats operating between Gulliver's cove and Digby gut. Fishermen report good scallop fishing when weather is favourable. Several new boats have been added to the fleet this season. Proceeded to Digby.

November 12. Proceeded to sea, picked up motor boat with two men, broken down and drifting to sea. S.W. gale. Took boat in tow to Digby. Ship at Digby in protection to scallop fleet, until lifeboat is in commission.

November 19. Proceeding towards Yarmouth.

November 20. Proceeded to Shelburne.

November 21. Arrived at Halifax for coal and supplies.

November 26. Proceeded to Sheet Harbour.

November 27. Proceeding towards Canso to protect the winter fishing fleet.

November 27 to January 24. Protecting winter fishing fleets from Canso, Arichat and Petit de Grat, and assisting fishing boats with engine trouble. Fishermen report poor season's fishing owing to haddock being scarce, and rough weather.

January 27. Proceeded towards Halifax.

January 28. Relieved *Sambro* lightship, and proceeded to Halifax.

February 2. Proceeded towards Lunenburg with new Lunenburg fishing schooner *Sigrid Amanda* in tow.

February 4. Moored ship at railway wharf Lunenburg for annual refit.

#### LOSS OF LIFE

The loss of life of those actively engaged in the fishing industry of this province I deeply regret to have to report was appalling. In addition to the eighty-two men of the Lunenburg fleet, previously referred to, who lost their lives during the big gale of August 24, when four vessels of that fleet failed to return to port, a number of shore fishermen as follows were drowned while engaged in their precarious calling:—

On April 24, R. Latter drowned at Herring cove, Halifax county.

On August 24, Arthur Covey and his son Charles, of Indian harbour, drowned off Prospect, Halifax county.

Two fishermen were drowned in Halifax county east.

Three fishermen of Petit de Grat were drowned during the month of November. The schooner *Virginia S* lost one man on November 22, when Mr. Alexie Martell was washed overboard from a dory by a heavy sea. On the 28th, Messrs. Edward DeRoche and Willie Brown lost their lives when returning from the fishing grounds. A heavy sea capsized their boat and although they clung to the bottom of the boat as long as possible and several of their friends attempted to save them they sank before they could be rescued.

#### PROSECUTIONS

In Appendix No. 8 will be found details of prosecutions for offences committed against the Fisheries Act in this province.

# REPORT OF INSPECTOR J. F. CALDER, DISTRICT No. 1, NEW BRUNSWICK, FOR 1927-28

District No. 1, New Brunswick, comprises the counties of Charlotte, St. John, Albert and the Bay of Fundy watershed of Westmorland county.

The following statement shows the catches and values marketed for the past year:—

		Value.....\$	
Cod.....	19,331 cwts.	58,247	
Haddock.....	32,735 "	70,589	
Hake.....	36,796 "	41,610	
Pollock.....	7,693 "	14,272	
Halibut.....	101 "	1,912	
Flounders.....	1,133 "	3,747	
Skate.....	157 "	431	
Herring.....	155,224 "	186,023	
Sardines.....	174,640 bbls.	1,046,250	
Alewives.....	23,000 cwts.	41,916	
Salmon.....	3,462 "	66,492	
Shad.....	1,698 "	18,600	
Smelts.....	194 "	1,903	
Mixed Fish.....	205 "	102	
Clams.....	24,493 bbls.	96,599	
Cockles.....	143 cwts.	500	
Green Dulse.....	2,870 "	7,040	
Lobsters.....	6,735 "	194,425	
Winkles.....	520 "	1,231	

The total marketed value of the catch was \$1,858,364, against \$2,296,541 for 1926, \$1,859,003 for 1925 and \$2,030,611 for 1924.

## COD

The catch of cod was 19,331 cwt. against 37,674 cwt. for the previous year. Cod were not so plentiful during the past year as they were the previous one, the demand for the fish was very poor and the opportunity to sell did not always exist. These factors account for a considerable portion of the decrease in the catch.

## HADDOCK

A large increase is to be noted in the quantity of haddock taken during the year—32,735 cwt. against 19,061 cwt. for the previous year. The increase in the haddock catch is due to two causes: first, the lack of market and very low price being paid for hake, and the increased opportunity to sell haddock in a fresh condition, the Maritime Fish Company of Digby, N.S., taking regular cargoes from Wilson's Beach.

## HAKE

The catch of hake was 36,796 cwt. against 34,120 cwt. for the previous year. The market conditions for these fish remain practically as they were during 1926. The average price paid during the past year for the round fish was 46 cents per cwt. This price was so low that very little energy was put into the fishery.

## POLLOCK

A large decrease is to be noted in the pollock catch—7,693 cwt. against 38,271 cwt. for the previous year. This falling-off in the yield is due entirely to a scarcity of the fish. Pollock were very scarce along the whole Atlantic seaboard. This was a serious blow to our fishermen, as slack-salted Quoddy pollock were generally in good demand, at fair prices. Of course, the price paid this year, due to the scarcity of the supply, was very high.

## HERRING

There was a falling-off of about 50 per cent in the herring catch for the year as compared with the previous one—155,224 cwt. in 1927 against 229,611 cwt. in 1926. This was due, principally, to a great falling-off in the run of herring at Grand Manan. The limited supply, however, was really a blessing in disguise for all those who engage in the smoked herring industry at Grand Manan, as their smoke houses were filled with the pack of the previous year. Owing to the very light pack during the past year, they were enabled to dispose of the stock on hand at fair prices.

## SARDINES

One hundred and seventy-four thousand six hundred and forty barrels were taken during the past year, against 171,637 barrels in 1926—practically the same quantity in each year—but the available supply differed greatly during the two years in question. During 1926 thousands of hogsheads of sardines were actually turned out of the weirs, as there was no sale for them. The factories on the American side actually closed down for the year by the middle of October. This year they kept open until the first of December. It is true that they did not open until July this year, but such was the case with most of them during 1926. Until July of the past year, Connors Bros. Ltd., was the only cannery that was open. Of course there were times when they could not take care of the entire supply, but the run was not very heavy and most of the fish were sold. After the American canneries opened up, the demand always exceeded the supply. The catch for the present year, therefore, really represents the available supply. The average price paid to the fishermen, \$6.60 per hogshead, is not a fair value for the product, and the industry is being conducted, on the whole, with very little, if any, profit. For the greater part of the year, the canners acted as an actual combine in the purchase of sardine herring supplies, with all of them paying \$5 per hogshead; but, during the latter part of the year, as the supply continued to be light and the buyers of lobster bait from Nova Scotia were procuring considerable quantities at the standing price, the canners started to raise it, with the result that, for a time, there was active competition among them in the purchase of herring at the weirs, and good prices were paid to the fishermen. The pack last year was comparatively light, all old goods are cleaned up and the past years pack is practically all disposed of also. Consequently, the canneries will all open in the spring, and it is to be sincerely hoped that there will be competition among them in the purchase of their supply of sardine herring, and that our fishermen will once again receive fair prices for the same.

## SALMON

The salmon catch was 3,462 cwt. against 3,810 cwt. for the previous year—a slight falling-off. Taken on the whole, however, this fishery is well holding its own.

## ALEWIVES

The Alewife catch was 23,000 cwt. against 34,000 cwt. for the previous year. A large portion of the alewife catch is salted, packed in barrels and exported to Haiti and other West Indian islands. There is very little demand for them at the present time, with the result that a considerable portion of the catch is yet on hand. The prospects for the successful prosecution of this branch, during the coming year, is not very encouraging.

## SHAD

There was a large falling-off in the shad catch for the present year—1,698 cwt. against 3,384 cwt. for 1926. While the catch in the Bay of Fundy

waters and St. John harbour was very light, at the same time, Overseer Barnes reports that a very large run of shad ascended the Petitcodiac river and successfully performed their function of propagation. It is to be hoped that the fishery will show the benefit of the same in the course of the next few years.

LOBSTERS

A slight increase is to be noted in the quantity of lobsters taken during the year—6,735 cwt. against 6,130 cwt. for 1926. I really think the increase in the yield is due more to favourable weather conditions during the past fall, rather than to any increase in the run of lobsters.

There is very little to note with regard to minor branches of the industry.

It is very apparent that the lot of the fisherman, under present conditions, is not a happy one. The run of fish, taken on the whole, is fairly satisfactory, and the fishermen have provided themselves with necessary, up-to-date equipment for catching the same; but they are seriously handicapped by their inability to find a ready market for their products at paying prices. This is especially true of the summer months when the run of fish is the greatest and the weather is good. The urgent need of the line-fishermen is development of the fresh fish and mild-cured industries. The salt fish industry appears to be dying out. The fresh, mild-cured and canned industries are taking its place. Except in sardine canning, there has been very little development along these lines in this district. There is a fairly steady supply of practically all kinds of ground fish of the very best quality, but neither facilities, capital nor business organization for development along modern lines. It is to be sincerely hoped that some such development will materialize in the near future.

There were 64 confiscations and 14 prosecutions during the year. In Appendix No. 8 will be found full details of the prosecutions for this district.

REPORT OF INSPECTOR A. L. BARRY, DISTRICT NO. 2,  
NEW BRUNSWICK, FOR 1927-28

District No. 2, New Brunswick, comprises the counties of Westmorland (Northumberland strait side only), Kent, Northumberland (except the North-west and Southwest Miramichi), Gloucester and Restigouche.

The total marketed value of the catch for the past year was \$2,504,560, as against a marketed value of \$2,998,007 for 1926, a decrease of \$473,281. The following tables show the catch and marketed value for the years 1926 and 1927:—

	1927		1926	
	Quantity	Value	Quantity	Value
		\$		\$
Lobsters.....	43,017 cwt.	760,628	53,481 cwt.	921,856
Smelts.....	45,990 "	684,260	59,088 "	846,850
Salmon.....	18,369 "	331,112	20,779 "	320,322
Cod.....	117,442 "	223,159	160,890 "	386,273
Oysters.....	13,574 bbls.	100,576	12,383 bbls.	92,535
Tomcods.....	20,246 cwt.	91,979	17,079 cwt.	61,242
Herring.....	257,609 "	193,593	194,290 "	201,756
Clams and Quahaugs.....	8,704 bbls.	34,099	9,445 bbls.	35,644
Mackerel.....	9,271 cwt.	30,303	19,088 cwt.	65,188
Alewives.....	7,950 "	10,025	17,717 "	28,426
Hake and cusk.....	8,963 "	18,692	5,166 "	11,583
Haddock.....	1,099 "	2,335	1,996 "	3,800
Shad.....	688 "	6,530	1,313 "	9,071
Flounders.....	55 "	55	50 "	50
Scallops.....			315 bbls.	708
Mixed fish.....	528 cwt.	528	51 cwt.	51
Trout.....	172 "	3,998	137 "	2,040
Bass.....	482 "	9,338	426 "	6,590
Eels.....	32 "	300	119 "	894

## LOBSTERS

Of the fisheries of this district the lobsters still hold first place in value although there was a decrease of 10,000 cwt. from the previous year. I would attribute a great deal of this decrease to the fact that there was better protection against out of season fishing in the northern district where in past years considerable lobsters were taken and carried to the open season district to the south and included in the catch of the fall season. I look for a considerable falling off in the reported pack in the northern district this coming year. In past years, a considerable illegal fall pack was made in certain parts of the northern district and included in the spring pack for the following year but there was very little of this during the fall of 1927 owing mainly to better protection, the low price of lobsters and the refusal of the larger dealers to buy any of this illegal stock. There were 125 lobster canneries in operation as against 129 in the previous year, a decrease of four. This decrease took place in the southern district and for some years past there has been a steady decrease in the number of canneries operating, as the operators cannot obtain enough lobsters to make packing profitable. Another reason is the ready market for the sale of lobsters for the live lobster trade which pays a better price for the larger lobster than the canneries can afford.

## SMELTS

There was a decrease of 13,098 cwt. in the catch with a decrease in value of \$162,590 from the previous year. This decrease may be partly accounted for by the fact that until after Christmas 1927 there was very little fishing owing to the lack of ice rather than to any noticeable decrease in the run of smelts. The fishermen sustained some severe losses in nets and gear owing to the ice moving out on two or three occasions after they had set their nets. Altogether about \$10,000 worth of nets were destroyed. The quality of smelts was good, particularly in the fall of 1927, and a good average price was maintained.

For the past three or four years the fishermen of the Miramichi district have realized that the number of nets set to catch smelts is out of all proportion to the quantity of smelts taken, there being about 3,000 licenses issued on the Miramichi river and bay. Throughout the summer, at the request of the fishermen, some meetings were held at which they voted almost unanimously for an increase in the distance between nets. Commencing December 1, 1927, all nets in the Miramichi district were set 200 yards from each other up and down the river where previously they had fished as close as 100 yards. The results have proven quite satisfactory and saves the fisherman who has struck a good run of smelts from being hemmed in too closely by other fishermen, as was the case previously. Better protection was given the smelts previous to the opening of the season with the result that there was very little illegal fishing done.

Less gill-net fishing was carried on from October 15 to December 1 than ever before and the fishermen are beginning to realize that this is not a paying proposition, as the smelts command only about half the price that they do in the colder weather. Last year the fishermen of Buctouche bay and the tributary rivers asked to have gill-net fishing prohibited which request was granted by the department.

## SALMON

There was a decrease of 2,410 cwt. from the previous year with an increase in value of \$10,566. The decrease was general throughout the district among the trap-nets, although the catch by drift boats in Northumberland strait was

about equal to the previous year. There was a considerable falling off in Bay Chaleur and Restigouche districts where all fishing is done with trap-nets. The decrease may be accounted for by the general fluctuations in fisheries from year to year. Nearly one million pounds were shipped frozen to England. The United States market also was always quite brisk and there was always a good demand for salmon the fishermen receiving from 10 cents to 12 cents per pound.

#### COD

There was a decrease in the cod fishery the catch being 43,448 cwt. and the value \$163,114 less than the previous year. Altogether the cod fishermen had a hard year as the continued damp weather throughout the fishing season made it next to impossible to put up a well dried product with the result that the market value shows a considerable decrease. Owing to the poor price paid, many boats of the fishing fleet stayed in the harbour. The price paid for dried fish averaged \$1 per cwt. less than the year before. The overseer in the Caraquet area reported that about 60 per cent of the fish were graded No. 2 quality.

#### OYSTERS

There was a increase of 1,191 barrels with an increase in value of \$8,041 over the previous year. Most of this increase was in the Miramichi Bay district where an increased catch of 1,075 barrels were taken. The increase was mainly due to the increased number of fishermen who came to the Miramichi from as far north as Caraquet and as far south as Buctouche. Last summer all dealers in my district were notified by letter from this office that a stricter check would be kept on the quality of oysters which were being bought from the fishermen. The overseers notified the fishermen that the size limit was to be more strictly adhered to. The inspector received many letters from the dealers saying that they were most ready to co-operate in putting on the market a better grade of oysters and the fishermen themselves were pleased when they received from \$1.50 to \$2 per barrel more for selected oysters than they had received the previous year. There is a wonderful opportunity for the development of the oyster fishery in this district and it is hoped that as a result of the meetings of the Royal Commission that some steps will be taken to improve the beds already in existence and develop new areas suitable for oyster culture. At the Commission sittings nearly all the oyster dealers asked for compulsory grading and standard packing of oysters.

#### TOMCODS

There was an increase of 3,167 cwt. with an increase in value of \$30,737 over the previous year. In February of last year there was very keen competition among the buyers of tomcods and as high as \$2.25 per barrel was paid where previously this fishery brought only from \$1 to \$1.50 per barrel. This accounts for the increase in value.

#### HERRING

There was an increased catch of 63,319 cwt., but a decrease in value of \$8,163.

#### MACKEREL

There was a decrease in catch of 9,817 cwt., with a proportionate decrease in value of \$34,885. This was not due to any decrease in the run of fish. It is regrettable that more fishermen did not go into mackerel fishing last year as owing to the fact that the Gloucester fleet did not strike the schools there was a brisk demand in the United States for these fish. In 1926 and 1927 the dealers

in this district had large stocks on hand which they were barely able to get rid of, with the result that they made very little preparation for buying in 1927, and so missed a most favourable market.

#### ALEWIVES

There was a decrease of 9,767 cwt. with a decrease in value of \$18,401.

#### CLAMS AND QUAAHAUGS

There was a decrease of 741 barrels and a decrease in value of \$1,545. There are now two canneries for canning quahaugs in my district, where a couple of years ago there were none. This probably accounts for the increase in value, although no apparent reason can be given for the decreased catch.

#### TROUT

There was an increase in the reported commercial catch, also a great increase in the catch in angling waters. Anglers of the Miramichi and tributaries report that the trout fishing was the best for years. This they attribute to the better protection given by the department in the prevention of fishing for trout through the ice, considerable of which was done until two or three years ago, particularly in the Bartibogue and Tabusintae rivers.

#### SCALLOPS

No scallop licenses were issued for this district last year. Good beds are known to exist in bay Chaleur, but as the fishermen are not familiar with the methods of taking this splendid shell fish and as they are hard to fish on account of living in deep water very little attempt is made to take them. It is hoped the commission will recommend instructions to the fishermen in the methods of raking scallops.

The other kinds of fish in my district are so unimportant that special mention need not be made of them.

#### PROTECTION

We had better protection on all kinds of fish last year than at any time during the past three years. The fishermen themselves seem to realize that in fishing illegally or countenancing it they are working against their own interests. Dealers, too, have awakened to the fact that the lobster fishery was doomed unless energetic steps were taken to protect this. In last year's report I spoke of a meeting held in Moncton in February, 1927, as a result of which more co-operation was looked for between the dealers and the department's officers. This has proven to be the case. At that meeting the dealers bound themselves to buy no illegal lobsters either in a packed or green state, and so far as I know all who signed the agreement have lived up to it. It was particularly noticeable during the close season north of the Chockpish. Some parties were looking everywhere for cans with which to put up illegally caught lobsters. They could not get these from the large dealers as in years past, and this was one contributing cause of the better conditions in the northern district last year. Only in one section of the northern district was any great attempt made to fish for lobsters in spite of preventive measures. This was in the district of Kent county, north of the Chockpish. Two additional patrol boats were put under the charge of the overseer there and with the result that nearly 5,000 lobster traps were taken up and the attempt to fish had finally to be abandoned by the fishermen, some of whom have no gear with which to start this year. It is regrettable that all this gear must be destroyed, but under the circumstances nothing else can be

done with it. If the traps were brought ashore they would certainly be stolen and put back into the water again. A number of prosecutions took place for breach of the lobster regulations, which had the result of slowing up the activities of the illegal fishermen.

Fishing for salmon out of season has long been a favourite pastime on the Miramichi for years past, but last fall more energetic steps were taken to interfere with this traffic. Additional and better guardians were employed to assist the overseer and by keeping their boats on the go day and night, and by changing the guardians, practically every net that was put in the water was seized, and it was admitted on all sides that very few salmon were shipped to the American market as in former years.

The same patrol was used to protect the smelts before the opening date, December 1, with excellent results.

As a result of the strict measures put in force more co-operation has come from the fishermen themselves, a greater number of whom fish out of season only because their neighbours do.

One necessity in this district is a fast sea-going motor launch available for any part of the district during the open water and this is being asked for, for this year. The last few years there has been a scarcity of salmon in the trap-nets of the Miramichi river. This scarcity has been laid to the drift-net fishermen, rather unfairly I think, as the charges are made without any real study of the facts. Of course there is no question that if drift-nets were not used more salmon would come up the river, but I believe there are other contributory causes, one of which has been the taking of so many spawn salmon during the fall of the year, in years past.

However, as a result of an investigation carried out by the department among the drifters and trap-net fishermen, restrictive measures will be put in force this year which it is hoped will remedy conditions somewhat. Drifting will cease on the 31st of July, one month earlier than in years past. The length and depth of their nets will be limited, which was not done before, and the trap-net fishermen in the river are to give up fifteen days at the end of this season. If, as a result, no increase in salmon is shown within a reasonable time more restrictions will probably have to be put on.

I quite agree that in order to have a well-balanced situation more salmon must reach the angling pools in the spring and early summer, but I do not agree with those who agitate that to this end the drifters should cease fishing for two weeks in June, which is the only month in which their operations really pay.

#### SEALS

Throughout the summer there was a bounty of \$3.50 paid on hair seal noses. In addition to the amount appropriated by the department for these bounties, the fishermen of the Miramichi held meetings and requested that the salmon license fees from the Miramichi be used for the destruction of seals at the mouth of the Miramichi. Altogether I paid out about \$1,700, representing payment on nearly 500 seals. This would indicate the destruction of at least 1,000 seals, as only about 50 per. cent of those actually killed are ever recovered. As a result there were fewer complaints about the seals last summer than for some years past, and it is hoped that the bounty will be continued.

#### LOBSTER CANNERIES

There is a steady improvement in the sanitary conditions and in the equipment used in the lobster canneries. Last summer one license was cancelled and the fee returned to the applicant as his cannery was not considered fit for use.

In another case the overseer was instructed to accept no application. In a number of others the owners were warned to carry out certain drastic measures for 1928, under penalty of being refused a license to pack.

Throughout the year there were 63 prosecutions as against 17 of the year before. There were also 131 confiscations as against 54 of the previous year. Prosecutions were for offences as follows:—

Breaches of lobster regulations.....	39
“ oyster “.....	4
“ salmon “.....	18
“ smelt “.....	2
Total.....	63

In appendix No. 8 will be found a list of those who were prosecuted in this district.

Considerable interest was taken by the fishermen and dealers in the sittings of the Royal Commission on Fisheries and as a result there is a more optimistic feeling that much good will come of the hearings. The fishermen all spoke well of the liberty they were given in expressing their views and the sympathetic hearing they received. They were frank in mentioning their faults in the past and in this way the commissioners got a real insight into the abuses by the fishermen themselves as well as the handicaps with which they have to contend.

#### REPORT OF INSPECTOR H. E. HARRISON, DISTRICT No. 3, PROVINCE OF NEW BRUNSWICK, FOR 1927-28

District No. 3, New Brunswick, comprises the counties of Kings, Queens, Sunbury, York, Carleton, Victoria, Madawaska and the tidal waters of the Northwest and Southwest Miramichi rivers in Northumberland county.

Spring opened up a little earlier than it did in 1926; the St. John river being pretty well clear of ice by April 20. By April 23 the waters of this river reached a height of about fifteen feet above low level, but did not reach the usual spring freshet level of about twenty feet above low level. The first gaspereau of the season reached the Fredericton market April 20. The weather continued cold and cloudy, with many rain storms, and the rivers and streams kept at a fairly high pitch nearly all season, and the season was not considered a favourable one from the fishermen's point of view, but it was of advantage to the earlier runs of fish such as gaspereau, shad and salmon. In comparing statistics for my district for the year 1927 with 1926 consideration must be given to the enlarged area in 1927. This added area comprises the tidal waters of the Northwest and Southwest Miramichi rivers and the tributaries entering them in that area—a considerable body of important water so far as the gaspereau, shad and salmon fisheries are concerned.

The total weight and value of the fisheries in 1926, excluding the area above referred to, and the total weight and value in the whole area in 1927 were as follows:—

Year	Cwt.	Marketed value
1926.....	2,936	\$30,930
1927.....	11,753	43,749

an enlargement of 8,817 cwt. and \$12,819 in value and the value of boats and gear added more than 100 per cent to the 1926 value.

Appropriate efforts were made to give the added territory proper supervision and I have no hesitation in saying that the local officer in that sub-district had proper respect shown in the matter of protection for the valuable fisheries.

Taking the 1926 area, and comparing the total catch and value in the same area in 1927, I find that there was a reduced catch of 265 cwt. and a less value of \$7,347, accounted for almost wholly in the smaller catches of bass and salmon.

## ALEWIVES

Fewer alewives by 98 cwt. were taken in 1927 in the same area that I had in 1926, consequently the large catch shown below was mostly taken in the Northwest and Southwest Miramichi rivers. The figures are

Year	Cwt.	Value
1926.....	758	\$2,274
1927.....	9,144	13,432

an increase of 8,386 cwt. and \$11,158.

In the St. John river area advices were to the effect that these fish were very plentiful during the spring run but the market was very limited therefore no particular effort was made to take more than were required for local consumption. In the Miramichi rivers area, i.e., the tidal waters, the quantity was 8,484 cwt. while statistics show that 9,000 cwt. were taken in the same area in 1926. I regret to have to report that the market for this fish was not good, and the price was low, and many hundreds of barrels remained in the hands of the dealers throughout the summer, with little or no profit to either fishermen or dealer.

## BASS

Year	Cwt.	Value
1926.....	220	\$3,888
1927.....	12	216

The bass fishery was almost a complete failure in 1927. In the St. John river area the drop was 200 cwt. and in the Miramichi rivers area none were taken in 1927. So far as the St. John river is concerned my experience is that there is a good run of bass about every twelfth year, but I had hopes for something more stable in the Miramichi area.

## EELS

Year	Cwt.	Value
1926.....	30	\$114
1927.....	125	500

While the price of this fish, to the fishermen was practically the same in both years, and was very low, there was a considerable increase in the quantity taken. Had the price kept as it was in 1925—17 cents per pound—it is possible that a much larger catch would have been taken in 1927, and the water rid to a greater extent of a pest.

## MULLET

Year	Cwt.	Value
1926.....	224	\$ 672
1927.....	255	1,005

This fish is used for baiting eel pots, to a considerable extent. There is also a considerable market for it in certain centres of population. Another reason why it seems desirable to take as many as possible from the rivers is the fact that it is presumed that it is very destructive to the eggs of shad and gaspereau, and possibly to the eggs of trout. A strange thing is the fact that trout and mullets appear to be great friends and very large fish of both species will lie together in considerable numbers in many clear water pools.

## PICKEREL

Year	Cwt.	Value
1926.....	368	\$4,416
1927.....	480	5,560

The very substantial increase in the catch of this fish is satisfactory, the fish were of large size and the price continued fairly satisfactory to the fishermen. It is a fishery that does not entail a large outlay for gear and it may be carried on the year round without the fishermen having to take much time from other work and it puts a few dollars into the pockets of the farmers living near waters where pickerel are fairly plentiful.

## SALMON

	Cwt.	To fishermen	As marketed
		\$	\$
1926.....	552	13,800	13,800
1927.....	378	9,250	9,250
1927.....	633	13,075	16,900
1926.....	732		
1927.....	255	3,725	7,650

NOTE.—The first set of figures are for the district as it was in 1926, i.e., excluding the tidal waters of the Northwest and Southwest Miramichi rivers, and shows a decreased catch of 174 cwt. in 1927 and a value decrease of \$4,550. The centre row of figures show the quantity and value in my present area. In this instance the St. John river fish is credited at 25 cents per pound and the Miramichi rivers fish at 15 cents per pound to the fishermen and 30 cents per pound to the dealers. The lower set of figures show the catch in the two Miramichi rivers—the same area, see Inspector Barry's report for 1926—with a smaller catch of 477 cwt. in 1927. With regard to the St. John river I have no complaint to make. The water kept fairly high during the month of June and half of July and salmon evaded the gill nets on the lower part of the river but good catches were made higher up, in York and Carleton counties. While this fishery fell off greatly in the upper area during the balance of the netting season it improved in the lower area—Kings county—and, notwithstanding the many and bitter complaints regarding the lack of effort on the part of your officers and guardians to enforce the law, and the great destruction of salmon by poachers, I think that I shall be able, before my report is concluded, to show that at least a fair proportion of salmon reached the angling and spawning waters. The fish were exceedingly well developed and very few grilse were taken in the nets. I anticipate that the development of hydro at Grand Falls which work will be completed sometime this year will affect the salmon fishery of the St. John river above Fredericton. The river will be kept at a higher level, probably, after the spring freshet subsides, and this may hurt some fishing stands and help others, and it is possible that it may spoil the angling altogether, or again it may develop other salmon pools. It will take a year or two to know what the result will be, and it will be interesting to watch the matter. Coming to the Miramichi waters, it seems to me that there is real cause for worry. The 1925 report gives the nets' catch as 992 cwt., the 1926 report as 732 cwt. and the 1927 report as 235 cwt. for the tidal waters now under my jurisdiction, with a similar decrease in the trap-nets district of Inspector Barry's district, I understand, while the drift-nets have taken a larger amount than in 1926. As this matter has received some consideration by your department, and is being further considered by the Royal Fisheries Commission, it is hoped that a remedy for present conditions may be found. At the session of Commission referred to, I was extremely pleased to hear two trap-net fishermen, who were strangers to me, voluntarily recommended that the size of the mesh

for trap-nets be made five and one-half inches, by law, instead of five inches as at present. As the department is well aware, I have for years advocated a six-inch mesh for salmon nets, of all descriptions, in all of our waters, and at a session of the commission in St. John a few days later Commissioner Robichaud advised the commission that he is in favour of the six-inch mesh. Such, it appears to me, would permit a considerable number of fair sized fish—6 to 8 pounds—passing through the nets if the fish happened to strike them, and would in a measure appease the anglers in giving them more fish to have a try at. It seems difficult to limit the number of nets allowed but I think that it would not be difficult to limit the length of them. Very few small fish are taken by the salmon nets in the St. John river but a very large number have been in years past, and up to the present, in the trap-nets in the Miramichi rivers and bay. It seems quite apparent that drastic action of some sort must soon be taken if the valuable salmon fishery of the Miramichi district is to be preserved, and a good deal may be done by the strict enforcement of even the present regulations.

## SHAD

Year	Cwt.	Value
1926.....	720	\$4,320
1927.....	674	4,044
1927.....	1,017	5,108
1926.....	680	3,800
1927.....	343	1,064

NOTE.—The top figures are for my district as it was in 1926 (excluding the tidal waters of the Northwest and Southwest Miramichi rivers) and for the same area in 1927. It will be observed that there was a slight decrease in 1927. The middle row gives the result in 1927 with the Miramichi district added and the lower set gives the result in the Northwest and Southwest Miramichi rivers alone in 1926 and the same in 1927, showing a 50 per cent decrease in the latter case, with only thirteen shad fishery licenses issued in that area in 1926, as against seventy-nine in the same area in 1927.

An analysis of the St. John river area shows that the Kennebecasis river, in Kings county, yielded 72 cwt. less than the previous year and that the Washademoak water, in Queens county, yielded 113 cwt. more and the St. John river, in Queens county, yielded 96 cwt. less than in 1926; a net loss of 55 cwt. in the two counties. The balance of the St. John river counties—Sunbury, York, Carleton and Victoria—do not figure strongly in the total; the gross catch there in 1927 being 46 cwt., which just equals the net loss in the St. John river area in 1927 as compared with 1926. As the four counties—Sunbury, York, Carleton and Victoria—cover about 140 miles of the St. John river; it would appear that 46 cwt. of shad taken from that area would not tend to affect the shad fishery seriously, consequently if it desired to curtail this fishery further it would appear that the remedy needs to be applied in the counties of Kings and Queens, particularly on the two tributaries of the St. John. If a remedy is applied I would suggest that it take the form of issuing only one shad fishery license to a family and that the licensee be required to fish his or her own net, instead of allowing two licenses to a family, which may be fished by any person. The fishermen on the river contend that shad were not scarce, either in 1926 or 1927, but that water conditions were very unsuitable both years; being too high for profitable fishing. On looking at the returns from the last shad area—just below Grand Falls—it would appear that a considerable quantity of shad reached there and were able to pass the nets below, and there were only three nets operated at Grand Falls. Coming to the Miramichi rivers the 50 per cent loss would appear to be a matter for serious consideration, unless conditions were very abnormal in 1927. With a 600 per

cent increase in licenses issued and a decrease of 50 per cent in the catch of shad it looks bad from any angle. The price at which a large percentage of the catch sells makes it a very cheap food, and I hope that the supply will not diminish.

## STURGEON

Year	Cwt.	Value
1926.....	57	\$1,425
1927.....	24	528

This fishery, carried on by a few persons, is not very prosperous, and the price for the meat was not good in 1927. A considerable number of very small sturgeon are taken in other nets and are generally lost. Fishermen are warned to liberate the small fish alive but because of the great number of nets of all kinds it is quite impossible to know what is done with a large percentage of small sturgeon.

The total weight and marketed value of the commercial fisheries in this district, as the district was in 1926 and for the same area in 1927, and in the enlarged district in 1927, are as follows:—

Year	Cwt.	Value
1926.....	2,936	\$30,930
1927.....	2,671	23,583

## ENLARGED DISTRICT

1927.....	11,753	43,740
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## EQUIPMENT

Value	Value
1926..... \$15,185	1927..... \$31,811

## DOMESTIC FISHERIES

The quantity and value of the domestic fisheries in this district in the years 1926 and 1927 were approximately as follows:—

	Cwt.	Value	Equipment	Value
1926.....	648	\$13,120		\$17,332
1927.....	598	11,015		25,102

The area was practically the same in both years, as I had the non-tidal water of the Miramichi rivers in 1926.

Statistical records from the various subdistrict officers, show that there were 50 cwt. less in quantity and \$2,105 less in value in 1927.

Reports from the local officers and various anglers during the season were that trout fishing generally was quite satisfactory, and in the Miramichi district particularly good. The lessee of Cains river said that he never saw a better run of sea trout in that river, and there was a particularly good run in the Southwest Miramichi above Cains river, which is a tributary. The anglers are more anxious however to get salmon and grilse and do not fish trout as was the case before salmon angling became such a sport. There are thousands of persons in this district who do not live beside salmon waters, or who cannot afford to fit out for salmon angling, to whom trout fishing is the chief recreation, and also for food at times, consequently the conservation of the present supply, and the propagation at the hatcheries and ponds by the department, to be later liberated in lakes and streams, is well worth while and should be, and no doubt is, appreciated by anglers.

Salmon angling on the St. John river was only fair. In York county the water was too high during most of the season. In Carleton county the same condition prevailed but it did not affect the pools so much and angling was fairly satisfactory, while in Victoria county high water, presumably, spoilt

such fishing. There is no question but that when the water is high salmon do not rest long in the various pools between Fredericton and Grand Falls, consequently it is much more difficult to take any. When the rivers are low the water is warm because of its sluggish movement therefore salmon will rest longer and in larger numbers in the cool spots, until the urge come upon them to move on towards the spawning areas on the Tobique and upper St. John, and it is while they are resting in these cooling spots that the anglers have their greatest success. The statement is often made by unthinking persons, or persons who do not know the facts, that, because salmon cannot be freely taken with the fly at all times, poachers are causing the trouble with nets. That may, and no doubt is a fact at times, but it is exceedingly seldom that such is the fact in recent years. Time was when a great many salmon were illegally killed with nets and spears on the St. John river, but evidence cannot be produced, during recent years, to show that many salmon have been illegally killed with either net or spear in this water. Vague statements by irresponsible persons are not evidence. Only three times since the year 1902 has the net catch of salmon on the St. John river been less than it was in 1927. At the same time the salmon anglers of the Tobique river had the best season in history—86 cwt. taken with rod and line against 398 cwt. taken by all the salmon nets in the whole St. John river area—while angling on the St. John was not good. The superintendent of the Tobique Salmon Club informed me that never within his experience of thirty-five years on that river did he see so many salmon descending the river after spawning as during the fall of 1927. Admittedly the continuous fairly high water was favourable for the ascent but that fact does not detract from my statement that large numbers of salmon reached the upper waters, and proves the numerous statements of "salmon unable to get up river," "antiquated service," "illegal fishing going on without let or hindrance," "fishery officers and guardian doing nothing but drawing their pay," as untrue. Possibly if the Government of the province of New Brunswick would spend a small amount of money, seeing that practically all of the revenue from the fisheries of the province goes to it, in placing a man here and there to co-operate with your officers and guardians, the service would be improved. It might at least satisfy those who are now making so much noise about the amount of illegal fishing taking place, and would give us a chance to check up on how badly your officers and guardians are falling down.

On the Southwest Miramichi salmon angling was not considered good; more particularly after the middle of July. Before that date there was no particular reason to complain, and here again the service provided by the department was not greatly to blame. I have been advised by a guide who spent the whole of the angling season on the river, in York county, that angling was good until the middle of July. Is it any wonder that angling was not very good during the whole season when we consider the fact of the very small catch of salmon in the trap nets and gill nets—a total of 255 cwt. in both the Northwest and Southwest rivers. The fact of the matter is salmon did not come into these rivers in large numbers in 1927, for what reason I do not know, but if angling was unsatisfactory it was not the fault of the officers and guardians. I am told by the same guide that never were there so many parties of anglers on the Southwest, in York county, as were there in 1927. Fishing parties followed one another continuously from the upper waters to Boiestown, besides the scores of anglers who spent from one to three weeks in specified areas. Two anglers from Boston, U.S.A., took nearly one hundred salmon and grilse in one small area—Burnt Hill pools—which is probably the best small area on the river. Hundreds of salmon and grilse ascended and remained in one small stream sixteen miles long—Rocky brook—in York county, in addition to numbers taken by anglers. Whether the great number and the great length of drift nets and

trap nets, or the vast number of hair seals, or a combination of both, brought about the conditions of 1927, as they were, I am unable to say, but there is no question about that salmon were comparatively scarce in those waters. In every instance wherein violations have been reported to me, and evidence of value furnished, prosecution has followed, with the exceptions noted below.

## PROSECUTIONS

There were twenty-seven informations laid against violators of the Act. In two instances informations were withdrawn because of the ages of the young offenders, but they were required to pay fairly heavy costs. One was withdrawn because of bad information, but was re-entered and a conviction made, and convictions were obtained in the other twenty-four cases, fines amounting to \$275, being paid in twenty cases and fines amounting to \$80, being suspended, pending future actions on the parts of the offenders, of which there were four. Details of these will be found in Appendix No. 8.

## SEIZURES AND CONFISCATIONS

Seventy-nine seizures were made and the articles, consisting of one old Ford car, one canoe, nets, wire traps, spears and torches, etc., were confiscated and mostly destroyed; \$82.10 worth of materials were sold and some stored for future sale—when the fisheries open in the spring of 1928.

## REPORT OF INSPECTOR S. T. GALLANT, PROVINCE OF PRINCE EDWARD ISLAND AND MAGDALEN ISLANDS FOR 1927-28

## PRINCE EDWARD ISLAND

The total marketed value of the fisheries of the province of Prince Edward Island for the year 1927 was \$1,367,807, an increase of \$8,873 over that of the year 1926.

The following table is interesting as showing the comparison of the catch and marketed value for the year 1927 with that of the preceding year:—

Kinds of fish		1926		1927	
		Quantity caught	Value marketed	Quantity caught	Value marketed
Cod.....	cwt.	49,823	118,700	49,419	127,627
Haddock.....	"	1,472	3,065	1,168	3,787
Hake and cusk.....	"	13,803	20,881	11,326	16,780
Mackerel.....	"	6,054	20,653	6,455	28,255
Herring.....	"	63,930	89,915	51,834	88,368
Crabs.....	"			135	360
Alewives.....	"	360	720		
Salmon.....	"	164	4,015	124	3,031
Smelts.....	"	15,390	98,670	14,936	179,232
Trout.....	"	111	1,332	61	646
Scallops.....	gal.			192	240
Caplin.....	bbl.	157	628	183	850
Eels.....	cwt.	192	2,162	131	1,358
Tomcod.....	"	2,331	4,664	1,823	4,195
Clams and quahaugs.....	bbl.	867	4,533	1,174	5,760
Oysters.....	"	5,161	61,898	4,071	48,838
Tongues and sounds.....	cwt.			68	1,360
Cod liver oil, medicinal.....	gal.	30	45		
Cod oil.....	"	5,730	1,719	4,010	1,203
Lobsters.....	cwt.	66,298	926,718	62,800	855,917

As the Royal Commission appointed to investigate all phases of the fisheries have held three sittings in the province of Prince Edward Island, I shall refrain from making any recommendations, confining my remarks to the actual fishing operations for the past season.

#### COD

The season opened with poor prospects for marketing; the local market became quite active, however, and absorbed the bulk of the catch, good prices being obtained.

The catch by sub-districts is as follows:—

	Cwt.
West Prince county.....	7,330
East Prince county.....	696
Queens county.....	34,632
Kings county.....	6,761

#### HADDOCK

The catch by sub-districts is as follows:—

	Cwt.
Queens county.....	205
Kings county.....	936

#### HERRING

On account of unfavourable ice conditions fishing began late in May; the catch, therefore, is a little below that of last year. A large percentage of the catch was placed in cold storage for fox feed, a development of this fishery, which enhances its value considerably.

The catch by sub-districts is as follows:—

	Cwt.
West Prince county.....	15,925
East Prince county.....	11,263
Queens county.....	8,178
Kings county.....	16,468

#### LOBSTERS

Our shores were surrounded with ice until the middle of May, and in some localities up to the 25th, which had a disastrous effect on this fishery. The ice moved off several times and some gear was set out, only to be destroyed, however, on the return of the ice which occurred on two or three occasions. It is impossible to expect a normal catch under such conditions, but, should the weather be favourable for fishing this spring, we may no doubt look forward to a much increased catch.

Japanese crabmeat is now an established product and is offering keen competition to the canned lobster. As a result, lobster packers will have to endeavour to put up a first-class article in order to establish a preference for their produce among the consuming public, and compensate for the difference in the price of crabmeat, which, I understand, is about one-third less than that of canned lobster. If the buying public could be assured of the superior quality of canned lobster no doubt a much larger quantity could be sold at a reasonable figure.

The catch by sub-districts is as follows:—

	Cwt.
West Prince county.....	13,975
East Prince county.....	10,411
Queens county.....	13,067
Kings county.....	25,347

## OYSTERS

East and West rivers with tributaries, Vernon, Orwell and Seal rivers are all well stocked with small oysters so that the future of this fishery in the above-mentioned rivers is assured. The Richmond Bay areas are very slow to recover and it will be many years before they attain their former state of productiveness. The oysters shipped from this province to the upper Canadian markets were in good demand and fancy prices were secured throughout the season.

## SMELTS

The smelt fishing season for gill-nets opened on the 15th day of October. The fish were scarce but of a good quality and sold at extremely high prices. The bag-net fishing season opened on December 1, and although the rivers did not freeze over before the end of the month, record catches were taken in the East river and at other points.

The catch by counties follows:—

	Cwt.
West Prince county .....	995
East Prince county .....	5,328
Queens county .....	8,066
Kings county .....	547

## FISHERIES PROTECTION SERVICE

We had six patrol boats in the service and with the aid of the overseers and guardians a great many attempts at illegal fishing were suppressed. There is no doubt that the only means of preventing illegal fishing is by having a sufficient number of patrol boats employed, the captains of which must be men well qualified for the position; otherwise, the service is bound to suffer.

Total number of confiscations for violations of the fisheries regulations during the season 1927 covering 100 seizures, 45.

Total number of prosecutions during season 1927, 19.

In Appendix No. 8 will be found full details of the prosecutions for this district.

## REMARKS

The fishways built in 1925 at Laird's, Campbell's, Dixon's milldams, and at Vernon river, are proving a success and trout are ascending in large numbers to the proper spawning grounds. This will eventually increase the fishing in the above-mentioned streams and it is hoped that the department will see fit to construct more of these fishways in other streams that are equally important. Our streams are being fished continuously during the summer months by our own people and numerous tourists and everything possible must be done for the propagation of these sport fish. Sportsmen from the other provinces are loud in their praises of the excellent trout fishing in this province, and if the supply is to be kept up every attention must be given to propagation.

## CAPITAL INVESTED

The total capital invested was \$1,117,473, which covers sail and row boats, gasoline boats, carrying smacks, gill-nets, trap and smelt nets, herring nets, tubs of trawls, handlines, lobster traps, fishing piers and wharves, ice houses, small fish and smoke houses and fish canning and curing establishments.

## MAGDALEN ISLANDS

The total marketed value of the fisheries of the Magdalen Islands for the year 1927 was \$722,105, an increase of \$88,882 over that of the preceding year.

The following table gives a comparison of the catch and value of the year 1927 and that of the year 1926:—

Kinds of fish		1926		1927	
		Quantity caught	Value marketed	Quantity caught	Value marketed
Cod.....	cwt.	38,892	87,010	38,894	83,238
Herring.....	"	101,600	76,222	110,217	69,535
Mackerel.....	"	17,595	66,035	61,885	177,046
Smelts.....	"	50	250	80	240
Eels.....	"	30	240	50	350
Clams and quahaugs.....	bbl.	1,975	11,500	1,615	9,690
Lobsters.....	cwt.	25,799	373,313	20,463	300,087
Squid.....	bbl.	25	250		
Tongues and sounds.....	cwt.	40	280	35	245
Hair seals.....	no.	1,200	2,400	50,357	56,462
Seal oil.....	gal.	3,500	1,750	63,030	21,314
Cod oil.....	"	6,700	3,350	6,340	2,653
Fish skins.....	cwt.	200	500	284	639
Fish fertilizer.....	"	300	75	480	606

#### COD

There was little demand for cod, and, as a result, this fishery was not carried on to any great extent. The catch was about the same as last year but the price was somewhat lower.

#### HERRING

Herring made their first appearance on May 12 and were very plentiful. Very few vessels called for bait, and as the demand for smoked herring is poor, this fishery is not as remunerative to the fishermen as it was some years ago.

#### LOBSTERS

Lobster canneries began operations on May 19, but on account of very blustery weather during the months of May and June, the catch was a little below that of last year, but the prices paid the fishermen were the same.

#### MACKEREL

Mackerel fishing with nets began on the 8th day of June and continued until the 20th, the largest catch in the history of the islands being landed, viz., 16,876 barrels. It is impossible to properly handle these fish in such large quantities, and as a result a great many of them were of poor quality and a much lower price had to be accepted for them.

#### SEALS

The increase in the number of seals caught was 49,157. The catch amounted to 50,357 seals which is a record catch for the Magdalens.

#### REMARKS

The arrival of the steamer *Lovatt* on the first day of May marked the opening of navigation to the Magdalen Islands. On her first trip from Pictou to the islands she encountered heavy fields of ice and was out for four days. This service is giving entire satisfaction so far as passengers and freight are concerned, and the captain and crew are very obliging and attentive to their duties.

It is pleasing to know that the people of these islands will have communication during the winter months with the outside world by means of the Air Service; this will doubtless be fully appreciated by them.

# REPORT OF INSPECTOR J. B. SKAPTASON, PROVINCE OF MANITOBA, FOR 1927-28

There was an increase of nearly two million pounds over the banner year 1926, which is accounted for by nearly 300 more men operating.

The following are figures for the last five years:—

Year	Quantity	Value to fishermen	Value as marketed	Number men employed
	cwt.	\$	\$	
1923.....	154,090	739,321	1,020,595	2,530
1924.....	177,898	886,410	1,232,563	2,828
1925.....	191,329	1,061,331	1,466,939	3,390
1926.....	304,143	1,744,642	2,328,803	3,809
1927.....	322,967	1,423,100	2,024,708	4,095

Increases are shown in catfish of 803 cwt.; pickerel, 12,562 cwt.; trout, 507 cwt.; tullibee, 17,184 cwt. Decreases are recorded in goldeyes, 205 cwt.; perch, 2,593 cwt.; pike, 3,301 cwt.; whitefish, 5,008 cwt.; sturgeon, 260 cwt.

## MARKETS

While our fishermen have produced approximately the same per man as in 1926, their returns in many instances have been meagre owing to extremely weak markets. With an increased production of nearly two million pounds, the actual revenue to the fishermen of the province is, \$321,542 less than 1926, and to the exporter and dealer; \$304,095 less. While all varieties excepting catfish, goldeyes and sturgeon were affected by the slump in prices, pickerel and tullibee fared worse than any others, dropping about two cents per pound. As these two varieties constitute over twenty million pounds, or nearly two-thirds of the total production, the serious effect to the whole industry can be readily calculated.

The following are comparative prices as marketed, of the more important varieties, for the last five years:—

	1923	1924	1925	1926	1927
Catfish.....	10-0	11-1	10-6	11-3	12-3
Goldeyes.....	5-0	4-4	4-2	4-0	4-7
Perch.....	8-6	10-6	11-2	13-4	10-9
Pickerel.....	8-4	8-5	11-5	10-3	8-0
Pike.....	3-7	3-5	4-0	4-0	3-7
Sturgeon.....	47-3	50-0	40-9	51-6	53-9
Trout.....	7-5	10-0	9-0	11-0	10-9
Tullibee.....	5-2	3-6	4-1	5-9	4-0
Whitefish.....	7-1	9-5	9-5	9-0	8-5
For total catch.....	6-6	6-9	7-4	7-6	6-1

It will be seen the price realized per pound is the lowest in five years.

The Sub-District of The Pas, comprising all waters north of, and including the Big Saskatchewan river, but not the northern part of lake Winnipeg, has enjoyed a good season in all varieties of scale fish. The somewhat lower prices

that obtained as compared with 1926, was fully offset by the increased yield. While there were more men operating, the catch per man was considerably higher than the previous year. The slump in price which affected other districts very materially, was not nearly as injurious here, as pickerel and tullibee, in which the biggest drop was recorded, constitute a very small proportion of the production in this district. Moose, Cormorant and Herb lake, were the chief producers.

Cormorant lake just about produced its limit of 75 tons by the end of the season, February 28, 1927, and Clearwater lake had produced its limit of 40 tons by the end of January. About half the production was shipped fresh (green).

Three new lakes which were fished in a small way were Armstrong, Partidge Crop and Pikwitonina. These are all small lakes out from Mile 214 of the Hudson Bay railway and the principal catches were whitefish and tullibee. The whitefish produced were of exceptionally good quality, mostly jumbos and large mediums. One license was issued for Reindeer lake, where the production consisted mostly of whitefish, trout and herring. The catch was almost entirely sold locally.

So far this winter, Beaver lake appears to be the big producer, the limit of 100 tons being taken by the end of December. It is expected the 40-ton limit for Clearwater lake will be reached early in January.

Summer fishing for whitefish was carried on in a small way in Moose lake. The catch was good, but lack of ice and poor transportation facilities did not warrant extensive operations.

#### STURGEON

Sturgeon fishing on the Churchill was good, eleven licenses were issued, but the men operating were poorly equipped, and between them did not have an outfit of nets for more than five men. They produced 14,800 pounds of sturgeon, average dressed weight being fully 30 pounds. The first consignment consisting of 467 sturgeon were brought to The Pas before Christmas. The overseer reports these as the best samples of sturgeon, size and quality, that he has seen in that part of the country.

Summer fishing for sturgeon on the Big Saskatchewan river and its lake expansions, may be termed a total failure during the past summer. Both Cedar and Cumberland lakes were tried out for awhile, but only 2,000 pounds of the 50,000 pound limit was taken. The Nelson river also was very disappointing, only a little over 30,000 pounds were caught. It is felt that the restrictions placed on the sturgeon fishing by the new regulations were not made any too soon.

The completion of the new railway under construction to the Flin Flon Mines, will bring a number of lakes much closer to railhead. Egg lake, the Cranberry lakes, Athapapuskow, Beaver and Cold lake, all good fishing waters, will be within easy hauling distance to the railway, and as this is expected to be completed within the next year, considerable impetus will be given the fishing industry of the district.

The statistical returns for the fishing industry of The Pas district are given under one heading. It may be of interest to show here, the production by lakes:—

Lake	Whites	Pickarel	Trout	Mixed	Men
	cwt.	cwt.	cwt.	cwt.	
Armstrong.....	133			50	1
Athapapuskow.....	332	182	170		5
Beaver.....	804	57	200		7
Cedar.....	30				3
Clearwater.....	785		90		10
Cormorant.....	1,021	449	66	135	13
Egg.....	562	2			4
Herb.....	1,213	577		372	13
Landing.....	646			86	4
Moose.....	2,389	728	374	100	32
Pelican.....	528	8			3
Pikwitonina.....	86				1
Partridge crop.....	440			120	3
Reindeer.....	85		75	20	1
Setting.....	97			114	2
Sturgeon.....	238	67	100	44	4
Windy.....	2				1
Wintering.....	202			38	1

## STURGEON FISHING

	Cwt.	Men
Churchill river.....	148	11
Sturgeon lake.....	3	2
Cedar lake.....	11	3
Nelson river.....	320	44

A great many of the men fishing in the district are only part time fishermen; mining prospecting, and trapping being their chief occupations.

Lake Winnipegosis has produced well during the year, there has been a slight increase in total catch. When it is considered the winter season was ten days shorter than that of 1926, and the summer fishing carried on under a limit, which was taken a week before the normal closing time, the increase in production is fully in proportion to the increased number of men operating. Below are figures for the last two years:—

	1926				1927			
	Whites	Pickarel	Other fish	Men	Whites	Pickarel	Other fish	Men
	cwt.	cwt.	cwt.		cwt.	cwt.	cwt.	
Summer.....	1,458	10,556	3,236	141	2,073	8,748	1,419	153
Winter.....	6,879	14,673	24,670	348	5,114	16,644	27,596	396
	8,337	25,229	27,906	489	7,187	25,392	29,015	549

Lake Dauphin shows a very marked increase over the 1926 production, with four less men operating. There is an increase from 875 cwt. to 2,313 cwt. The chief increase is in pickerel, of over one hundred thousand pounds, which increase took place mostly in the first two months of the present season, November and December, 1927, and can be ascribed to the high waters in the spring of 1927, allowing a good run of fish from lake Winnipegosis up the Mossy river.

Lake Manitoba shows a slight decrease in production with two less fishermen operating. The total catch is 7,398 cwt. less than 1926.

The following are five years' figures:—

	1923	1924	1925	1926	1927
Number of fishermen.....	626	779	905	1,128	1,126
	cwt.	cwt.	cwt.	cwt.	cwt.
Total production.....	25,655	48,658	51,587	85,256	77,858
Catch per man.....	41	62	57	76	69

The decrease is in all varieties excepting whitefish, which shows an increase of 529 cwt.

This lake is well served by railways on both sides, and for that reason lends itself particularly well to the fresh fish industry, which is becoming more and more popular. Prices obtained by this method of marketing, are as a rule much higher than for frozen stock. The present winter however, has been a disappointment as regards prices for fresh fish. There appears to be some definite evidence of a combine by New York commission men to keep down prices, and this is the chief outlet for fresh fish from the province.

Lake St. Martin shows a slight increase over last year in whitefish.

Lake Winnipeg taken all through, this lake has had a most productive year. With 132 additional operators, the catch of all fish shows an increase of nearly two million pounds.

	1925	1926	1927
All fish.....	84,763 cwt.	141,726 cwt.	161,597 cwt.
Number of fishermen.....	1,791	1,828	2,096
Price marketed.....	\$644,530	\$1,104,003	\$1,065,828

It will be seen that with approximately two million pounds increase in production over 1926, there is a depreciation in actual market value, of nearly forty thousand dollars.

Whitefish shows a falling off both in winter and summer fishing of 9,000 cwt. while nearly every other variety records a substantial increase. The greatest increases are in pickerel and tullibee, the former recording an increase of 12,000 cwt. over 1926, and the latter 18,000 cwt. These however suffered the greatest slump in prices, an average of about 3 cents per pound as paid to fishermen. The tullibee market was very poor throughout the year, and those operating extensively, or almost entirely for tullibee, had a poor year in spite of the good catch. Over a million pounds was placed in cold storage locally, and in Winnipeg, and much of it did not move until late in the summer and fall.

The summer whitefish season was rather a disappointment. With the limit of 3,000,000 pounds fully taken in 1926, a week before the season expired, there was general optimism for 1927. The catch was very disappointing however, and was nearly 700,000 pounds short of the limit.

The following are five years' figures for the summer whitefish operations on lake Winnipeg:—

1923	1924	1925	1926	1927
cwt.	cwt.	cwt.	cwt.	cwt.
15,238	14,567	23,330	33,115	25,679

It seems to be fairly generally thought that the decrease in the catch for this season should not cause any alarm. Unfavourable conditions prevailed; the season was late in starting, owing to ice, and was rather cold throughout, which usually keeps the fish from schooling. Indications towards the latter part of the season were for a marked improvement, and some very big individual catches were then made.

The fall season was good, with increase in production of both pickerel and tullibee. The increase in the latter was of course due to the change in the regulations allowing the use of tullibee nets from October 20 to the end of the season. The run of fish was not as heavy as the previous year, but legalizing the regular tullibee nets for this period compensated for it.

The following are figures for the pickerel production during fall and summer:—

1925 cwt.	1926 cwt.	1927 cwt.
10,626	22,860	30,724

Tullibee caught in fall operations:—

1925 cwt.	1926 cwt.	1927 cwt.
3,404	16,620	19,475

#### ANGLING

There is a considerable increase in the number of angling licenses issued during the year: 554 as against 194 in 1926. This is no doubt due to the inauguration of the one-day dollar permit, and the patrol by a special guardian throughout the summer of the lakes along the southern Manitoba border. These lakes do not offer much in the way of variety to the angler, and really nothing in what may be termed as sport fish. Pike, and in some few instances pickerel and perch, are taken. Rock lake, lake Killarney, and Oak lake are the favourite hunting grounds of the North Dakota anglers. Of these lakes, Oak lake has been the best during the last two years.

During the year there were fifty-four prosecutions in the province, for the following offences:—

Fishing illegal mesh nets.....	24
Fishing without permit or license.....	21
Illegal possession.....	5
Fishing in close season.....	3
Sturgeon fishing in prohibited area.....	1
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There were 244 confiscations during the same period. In all, 335 illegal nets have been confiscated.

Fines collected, \$311.

Sales of confiscated articles, \$1,120.05.

In appendix No. 8 will be found full details of the prosecutions for this province.

Mr. Wm. A. Found, Director of Fisheries, visited the province early in May, with a view to holding conferences with fishermen and dealers. Well-attended meetings were held at Selkirk, Winnipeg, and Winnipegosis. The fishery regulations were thoroughly reviewed at these meetings, and many valuable suggestions made for changes and amendments, which materially assisted in their revision and consolidation.

## REPORT OF INSPECTOR G. C. MacDONALD, PROVINCE OF SASKATCHEWAN, FOR 1927-28

During the year there was a commercial production of 57,800 cwt. of fish, this being an increase of 1,085 cwt. over the previous year. The increases and decreases in the different species were:—

Species	Increase	Decrease
Whitefish.....	3,656	
Pickarel.....	835	
Goideyes.....	5	
Pike.....		623
Trout.....		406
Sturgeon.....		30
Tullibee.....		689
Mullets.....		492
Mixed.....		1,171
	<u>4,496</u>	<u>3,411</u>

### WHITEFISH

The increase in production of whitefish was largely shown from Peter Pond and Churchill lakes, with a combined catch of 5,742 cwt.; lac la Ronge, 908 cwt.; Dore lake, 1,758 cwt.; Waterhen lake, 351 cwt.; Turtle lake, 460 cwt.; and Makwa lake district, 151 cwt., and was generally due to more yardage of nets. There was also an increase shown from lakes in the Qu'Appelle valley of 111 cwt., due to the advancing of the winter fishing season and more men operating.

There was a decrease in whitefish production from Red Deer Lake district of 1,244 cwt., due to the waters in that area being now included in the National Park, where no fishing was carried on during the summer or December seasons. Jackfish lake decreased 336 cwt. due to the restrictions during the summer season. There was a decrease shown in the Ile a la Crosse district of 2,366 cwt. of whitefish. Of this amount Kelly lake would account for 194 cwt., where fewer nets were used; Churchill river, 50 cwt., where no fishing was carried on during December; Deep river decreased 237 cwt.; and Ile a la Crosse proper, 1,855 cwt. Deep river is the connection between Ile a la Crosse lake and Churchill lake, the waters flowing from the latter. Near the outlet from Churchill lake is the connection between that lake and the east end of Peter Pond—locally called Little Buffalo lake. During the early part of December the run of fish in Deep river was from Ile a la Crosse lake to Churchill and Buffalo lakes, due largely to higher water levels. The production on the latter two lakes was unusually good, and it is claimed a large quantity of the whitefish taken were Jumbo whitefish and the same species as had been taken on Ile a la Crosse lake during previous years, with the result that the fishing on Ile a la Crosse lake was unusually poor during the present winter season. This migration of whitefish has happened on previous occasions in the same area.

There was also a decrease shown of 1,186 cwt. of whitefish on Long lake, when thirty-four fewer men operated. The decrease in the production may not only be due to fewer men operating but also to a large closed area against commercial fishing, and the water level, being some 4 feet higher, had a great effect on the migrating of whitefish from the closed area to the deeper waters where fishing was allowed.

There was a decrease shown of 406 cwt. of trout. This was due to no fishing being done on Kingsmere lake (Little Trout) or Crean lake, which have been taken within the National Park. The decrease of 30 cwt. of sturgeon was due to revised regulations prohibiting summer fishing for sturgeon. There

was a considerable decrease shown of the coarser species, which was largely due to the early freeze-up during November, allowing practically all fishing to be done in deeper waters during the opening of the winter season.

#### GREEN FISH

There were 2,171 cwt. of fish shipped during the winter season in a green condition, which was an increase of 852 cwt. over the previous year. Of this amount, 2,071 cwt. were whitefish and 100 cwt. tullibee. All of the above fish were shipped from Jackfish, Turtle, Makwa, and Waterhen lakes in the North Battleford district.

#### MARKETS

The total market value of the year's commercial production was \$503,609. This was an increase in value over the previous year of \$59,321 and was due partly to a larger production as well as an increase in the quantity of green fish shipped during the winter season. The markets during the closing of the 1926-27 winter season became slightly over-supplied, resulting in a quantity of fish being stored, largely in the United States. At the opening of the 1927-28 winter season the buyers were fairly keen and the season opened with a slight increase in price over the previous season. It is believed that the general limitations on production on all waters will be a big factor in regulating the markets, as the amount of fish available will be more definite than in previous years. The local markets appear to be well looked after, as one large fish company in particular specializes in local distribution of small and mixed shipments.

#### EQUIPMENT

The total value of all equipment used during the year in connection with the commercial operations was \$91,967, this being a decrease of \$3,727 from the previous year. There was an increase shown of 580 gill nets valued at \$9,501, and an increase of 2 ice houses on Dore lake.

There was a decrease shown of 7 smoke houses valued at \$4,350 all on Peter Pond lake where there are none shown for the year; a decrease of 2 piers, 3 on Long lake, and an increase of 1 on Okemasis lake. There has been a decrease of 27 row boats, 1 on Jackfish lake and 20 on Turtle lake, 2 on Okemasis, 6 on Red Deer, and an increase of 1 on Pierce lake and 1 on Makwa lake. There was a decrease of 8 gasoline boats, 1 on Jackfish lake, 4 on Turtle lake, 3 on Okemasis lake. The above decreases were all due to less summer fishing in the various districts.

#### CONDITION OF FISHERIES

The general condition of the fisheries throughout the province might be considered as favourable, and a much wider interest is evident, especially throughout the northern portions of the province, due to some extent to the scarcity of fur-bearing animals, resulting in an increased number of the native population fishing. Very few new waters were opened up during the year, and outside of Pipestone lake the operations during the year were all on waters that had been fished for a considerable time. Fishing in Ile à la Crosse lake dropped off considerably during the month of December, and especially in whitefish production due to the migration to other waters. Dore lake, which has been a very large producing water, has improved considerably over the previous year. Fishing in the Waterhen lake district shows a slight improvement. Lac la Ronge, which is the largest lake operated, has had an average production. In Long lake, where the commercial operations have been gradually restricted, the results were that neither the winter nor summer limit was

reached. Three lakes, Kingsmere (Little Trout), Crean and Red Deer, have been taken within the National Park during the year. Over fifty fishermen who had been operating on these waters during previous years producing a considerable quantity of whitefish and trout have since discontinued fishing or moved to other waters throughout the province. Other waters are retaining their production at about normal.

## OBSERVANCE OF REGULATIONS

During the year there were 57 prosecutions and a conviction was secured in all cases, resulting in fines amounting to \$277.50 being imposed with additional court costs of \$212.50, as follows:—

Fishing during close season.....	21
Fishing without a license.....	15
Offering fish for sale under Dominion license.....	2
Fishing with illegal apparatus.....	8
Possession of fish during close season.....	8
Failing to tag nets when in water.....	2
Illegal possession of fish.....	1
	<hr/>
	57

There were also 42 confiscations made during the year, as follows:—

Illegal apparatus.....	16
Illegally caught fish.....	18
Legal apparatus.....	8
	<hr/>
	42

There were 17 sales of confiscated articles made during the year, amounting to \$229.19.

In Appendix No. 8 will be found full details of the prosecutions for this province.

## FISHWAYS AND DAMS

During the fall of 1926 some of the important fishways in dams in the southern portion of the province were inspected by the fisheries engineer. Amongst these were the fishways at Katepwe, Craven and Pasqua, and three on the Moose Jaw creek near Moose Jaw, and all of which required some minor alterations. No repairs have been carried out on any of these fishways during the year. The dam over the Red river at Red Wing was removed during the spring. The fishway in the Cowan river dam is in good condition, but the dam will probably require some repairs during the coming season. A new fishway was installed in the Gravelbourg dam on Wood river. Arrangements were under way to have fishways constructed in small dams on the various creeks in the Cypress Hills area but owing to the very high waters during the entire summer season none of this work was undertaken.

## DOMESTIC

There has been a production during the year under domestic net fishing of 14,349 cwt. of fish, this being a decrease of 980 cwt. from the previous year. Whitefish decreased 950 cwt.; trout, 1 cwt.; pickerel, 4 cwt.; tullibee, 219 cwt.; mullets, 13 cwt.; and mixed fish, 85 cwt. Pike increased 274 cwt, and Goldeyes 18 cwt. The average catch per license was 1,461 pounds as compared with 1,611 pounds the previous year.

## ANGLING, 1927

There was an estimated catch of fish by anglers during the year of 23,139 cwt. This is a decrease of 3,776 cwt. from the preceding year. There has been

43,041 anglers reported, being a decrease of 1,873 from 1926. This decrease in catch and number of anglers is reported to be largely due to the unfavourable weather conditions during the summer season. The average catch per angler was 54 pounds of fish, as compared with 60 pounds during 1926.

#### EXAMINATION OF WATERS

There were twenty-four waters examined during the year to determine their suitability for fish life. Of this number twenty-one were reported to be suitable.

It is gratifying to be able to report that as a result of the planting of cisco or lake herring in Quill lake during the spring of 1924, that about 200 pounds of this species was taken in nets during this year, and also that 300 pounds of whitefish were taken from the same lake. Although the first official planting of whitefish was made during April, 1926, it is presumed that accidentally whitefish fry got mixed with the cisco planted during 1924.

The staff of fishery officers gave considerable assistance to the Fish Culture Branch officers during the year.

I regret to report that four of the older fishermen were drowned during the fall, and that none of their bodies have as yet been located.

#### REPORT OF INSPECTOR R. T. RODD, PROVINCE OF ALBERTA, FOR 1927-28

The commercial catch shows a decrease in both quantity taken and value as marketed. Market conditions in the spring were poor and this accounts mostly for the decrease in both quantity and value. There was a practical cessation of fishing at Buffalo bay and Lesser Slave lakes, where an amount exceeding 500,000 pike and pickerel was obtained during the spring fishing of 1926. Very stormy weather prevailed during August and September at Lesser Slave lake, many fishermen reporting the entire loss of equipment.

#### INCREASES

The most gratifying increase to be recorded for the past season is on lake Athabasca where the summer fishing for trout was the best on record. While close to 1,000,000 pounds of trout and whitefish was obtained, almost the entire amount was caught by one company, a second company starting operations too late to do much fishing. Reports were received that, owing to the heavy catches, it was necessary for the operators to stop fishing periodically as they were unable to handle the fish caught with the limited equipment on hand.

In spite of the great distance from lake Athabasca to Chicago and other eastern points the shipments of trout and whitefish arrived at their destination in splendid condition. The trout are of an excellent quality, the flesh being pink and the fish of uniform size between 7 and 10 pounds, although specimens exceeding 40 pounds were caught. A small increase in the catch was reported for the Lac la Biche district and Moose lake for the summer season, and during the winter season at Pigeon, Lesser Slave, Sturgeon, Primrose and Cold lakes. Fishing in the latter lake was particularly good, the limit being obtained in slightly under one month's fishing. It is also noted that a large increase is shown in the Peter Pond lake district in Saskatchewan where there was more extensive fishing through commercial licenses being granted. Good fishing at Churchill lake obtained during the first part of the year. This district is in excellent shape and should last with the present limit for many years to come. This district shows an increase in the neighbourhood of half a million pounds, chiefly of whitefish and pickerel.

## DECREASES

The heaviest decrease recorded is from Lesser Slave lake where the usual heavy spring fishing, as witnessed the year before, was seriously affected by the market conditions prevailing. It was reported that the market was glutted with coarse fish from the other western provinces, hence fishing in Lesser Slave lake was more or less at a standstill. I have no reason to believe that the lake is depleted, and without question the present safe limit should be easily obtained. Lac Ste. Anne and Wabamun show slight decreases, as well as Beaver lake which was heavily fished the year previous and showed up poorly during 1927. This lake is considered to be in a depleted condition. The winter operations show the lakes as producing fairly steady with the exception of Winnifred lake, which was also too heavily fished the previous winter. Winter prices were extremely good and market conditions generally excellent.

## MARKETS

Spring prices, as already reported in so far as this province was concerned, were poor and it was almost impossible to dispose of jackfish at any price. The price for whitefish during the summer was fair and good in the fall. Athabasca trout are gaining an enviable reputation in the eastern markets and are standing the long haul from lake to market very well. Extension of this market may be expected, through larger operations now contemplated at lake Athabasca. It is expected that three companies will be operating on this lake for 1928. Three hundred thousand pounds of the trout caught were pan frozen and shipped after the season closed and were marketed very successfully. It is stated by one of the companies about to operate that a market was assured for their whole catch. Winter prices have been very good and the majority of fishermen and dealers are satisfied with their season's work.

## TRANSPORTATION

There has been no great change in this feature over last year, with the exception of transportation from lake Athabasca to Waterways. The companies operating have invested heavily in equipment for catching and sending the fish to market in the best condition. Great care is being taken to see that the fish is properly iced and taken as swiftly as possible from the lake to the end of steel at Waterways, a distance of over 200 miles. Present developments comprise three new stern wheel boats, a new freezing plant at the lake, an ice-making plant at Waterways, and ammonia freezing plants on the barges conveying the fish up the Athabasca river, as well as many buildings for the men and horses. The trail from Cheecham to Peter Pond lake was in good condition last year, there being plenty of snow to commence operations. The express companies co-operate well with the fish dealers and every facility is being given by the railway companies to see that the fish arrive in the best possible condition.

## EQUIPMENT

As has been previously explained, the Lesser Slave lake fishermen were heavy losers both in nets and boats through the bad storms on that lake during the fall. Some loss was also felt in piers and wharves through ice movements in the spring. One Edmonton fish company has installed a large cold storage and freezing plant in Edmonton, using the Ottesen process, with a storage capacity of six cars. Two companies are desirous of building freezing plants on Peter Pond lake for summer fishing. Altogether there is a keen desire evident from all quarters of maintaining and, if possible, improving the standard of fish exported from Alberta. Cottages and boats were built at Cold lake to accommodate anglers and there is now ample room for all anglers at this most popular resort.

## OBSERVATION OF THE REGULATIONS

The number of prosecutions for the year 1927 was 73 and the number of confiscations 41. Full details of prosecutions will be found in appendix No. 8.

Fishing in close season contra to Sec. 21 and 33.....	15
Fishing without licenses contra to Sec. 1.....	13
Fishing with illegal mesh net contra to Sec. 17 and 11.....	11
Pollution of streams contra to Par. 44.....	9
Fishing without angling permit contra to Sec. 32 (a).....	8
Fishing in closed waters contra to Sec. 24 (c).....	7
Having undersized fish contra to Sec. 34.....	4
Fishing with lights at night contra to Sec. 29.....	2
Fishing with illegal apparatus contra to Sec. 11.....	1
Obstructing creek contra to Sec. 12 (1).....	1
Selling fish under domestic license contra to Sec. 2.....	1
Assisting angler to fish contra to Sec 32 (a).....	1
Total.....	73

Much valued assistance was given by the undermentioned associations as well as by the sixty-two honorary guardians appointed for the purpose of assisting the overseers and guardians in their large territories:—

1. Northern Alberta Fish and Game Protective Association.
2. Coleman Rod and Gun Club.
3. Claresholm Fish and Game Protective Association.
4. Lethbridge Rod and Gun Club.
5. Calgary Fish and Game Protective Association.
6. McLeod Anglers' Association.
7. Bellevue Fish and Game Association.
8. Pincher Creek Anglers' Association.
9. High River Angling Association.
10. Cardston Fish and Game Association.

## IRRIGATION SYSTEMS

Owing to the heavy rain fall and continued wet weather throughout southern Alberta very little irrigation was required, in fact some of the small systems were never opened during the summer. No complaints have been received regarding destruction of fish.

## DAMS AND FISHWAYS

The fishway in the Canadian National Railway's dam at Burbank on the Blindman river was again taken out by the ice in the spring, owing to high water during the summer. This could not be repaired until late in the season, when a new fishway was installed. This was placed to one side of the spillway and where it is now protected from ice and high water by the wings of the dam.

The fishway in the Canadian Pacific Railway dam in the Vermilion river at Hazeldine, Alta., has been completed and is in good condition. A new fishway was also erected in the Canadian National Railway dam in the Lobstick creek at Leslieville. Repairs were also made on the fishways in the Canadian National Railway dams in the Vermilion river at Vermilion and Vegreville. The dam in Willow creek, owned by the town of Claresholm, was carried away in September by flood; this has allowed a great quantity of pike and suckers to ascend to the upper reaches of the creek. This dam was considered beneficial to the trout fishing, as it prevented the pike and suckers from ascending to that part of the stream frequented by trout. It will be rebuilt as soon as possible.

The large dams on the Bow river at Bassano and Carseland owned by the Canadian Pacific Railway and Canada Land and Irrigation Company and the Eau Claire dam at Calgary, in my opinion have greatly benefitted the trout fishing in the Bow river and tributaries, as they have prevented innumerable

quantities of pike and suckers from reaching the trout waters. This is especially so with regard to the first two named, as no trout are found below them, and that part of the river is infested with very large quantities of pike, suckers and ling.

#### ANGLING

Angling throughout the province was not so good as during 1926. This was not due to the streams being depleted but due to the continued wet weather through the greater part of the season, which kept most of the roads in an almost impassable condition and also kept the streams flooded and in a muddy condition. This was especially so in the southern part of the province. There were a few short periods when the roads were passable and the streams clear, when excellent catches were taken especially in the Highwood river. Good angling was also obtained in Willow creek and in the Old Man river and some of its tributaries when the water was clear. There was also an increase in the angling carried on at Cold lake for lake trout. The sale of angling permits was increased from 643 in 1926, to 926 this season, and the catch taken by anglers increased from 42,370 pounds to 54,735 pounds. The largest trout taken during this season was 40 pounds. The angling for pike, perch and pickerel in the lakes was good and especially so in Lac la Nonne where excellent catches were taken.

#### EXAMINATION AND RESTOCKING OF LAKES

Very few lakes were examined during the year with a view to stocking, only ten being examined by myself and staff. An attempt was made to stock a few lakes by transfer of adult fish by the staff with the assistance of the parties interested in the lakes, but very little was accomplished owing to the bad condition of the roads. Those who agreed to supply the transportation refused to put their cars over the roads, therefore a number of fish already trapped for transfer had to be liberated and the work abandoned.

A few facts regarding the stocking of waters with fry from the Banff hatchery might not be out of place. During October, 1919, Hybernia and Marjorie lakes in Jasper Park were stocked with rainbow trout fingerlings, 4,000 being liberated in each. Until that time these lakes contained no fish of any kind. I have while at Jasper recently received numerous reports of very fine rainbow trout having been caught from Hybernia lake, some weighing up to 4 pounds.

Large rainbow have been seen in Marjorie lake during the spawning season, but it is claimed they are very difficult to catch. The fish will not take the artificial bait owing to the great amount of natural food in the lake.

Loch Leven trout up to ten inches in length were taken in the Little Red Deer river this season, which is the result of stocking since 1924. Rainbow trout up to 3½ pounds were also taken in the Highwood river, the result of the stocking during the season 1919 and each year since. About 30 per cent of the catch from this stream is rainbow trout. These trout are now being taken from numerous other streams in southern Alberta where they have been liberated and where none were found previous to stocking from Banff hatchery.

#### REPORT OF CHIEF INSPECTOR MAJOR J. A. MOTHERWELL, WESTERN FISHERIES DIVISION (BRITISH COLUMBIA) FOR 1927

##### SALMON

The calendar year of 1927 closed with a total pack of 1,361,977 cases of salmon, as against 2,065,190 cases in the previous year. The year of 1926 produced the record pack of the province, but the comparison of these two years

is not a fair one when endeavouring to arrive at the condition generally of the salmon industry. The only fair comparison would be by taking the packs of the several varieties and comparing each with that of the brood year in each case. A very erroneous impression is created in the minds of the public by newspaper and other reports being published which do not make the correct comparison.

The average pack of all varieties for the past five years was 1,641,381 cases and had it not been considered necessary to greatly curtail fishing operations during the year, undoubtedly the 1927 pack would have almost, if not quite, equalled the record one of 1926.

The pack of sockeye amounted to 308,052 cases, compared with an average of 348,442 cases during the past five years.

In the Naas river area the total was 11,986 cases, which is not at all good although this has never been a remarkably productive sockeye district. Considering the fact that a considerable portion of the runs of sockeye heading for the Naas river run the gauntlet of the intensive fishing by traps and seines in southeastern Alaska, in addition to the gear on the Canadian side of the line, it is not considered surprising that the sockeye pack on the Naas is not being maintained.

In the Skeena system the total in the case of sockeye was 83,988 cases, which, particularly in view of the extra measures taken in the way of closed periods, may be considered as quite satisfactory. There would appear to be no reason to anticipate that the supply of this variety in the Skeena system cannot be maintained.

The Rivers and Smiths Inlet district produced a pack of 101,053 cases of sockeye, which is a very satisfactory showing. Owing to the large number of gillnet boats being fished it was necessary to enforce an additional nine hour close period during each week-end of fishing.

The Fraser river again produced an unexpectedly large pack of sockeye, amounting to 57,085 cases. A considerable portion of this was due to the unusually late run similar to that which ascended the river in the late fall of 1926. As the sockeye to the Fraser system are predominantly four year fish, a fair comparison of the pack would be with year 1923, when the total amounted to 29,423. However a more informative comparison would result from the inclusion of the catch in the Puget sound area. In 1923, the brood year, the pack of Puget sound and the Fraser river together was 76,825 cases and in 1927 it amounted to 153,428 cases, an increase of 100 per cent.

The coho pack for the whole province amounted to 162,732 cases, as against an average for the past five years of 158,978 cases.

The total pinks produced in the province amounted to 247,626 cases, compared with the average of the past six years of 524,413 cases. This shows a reduction of 80 per cent compared with the brood year of 1925, when the total was 445,400 cases. The shortage was practically all in the northern district. One suggestion as to the cause of the small runs is that after the eggs were hatched out in the brood year of 1925 the mortality in fry was unusually heavy, or that conditions at sea, between the time the fry left for the salt water and when they returned as mature fish, were such as to permit only a small percentage to survive and return to the streams in which they were hatched. Another suggestion is that very intensive fishing in the areas to the north of the international boundary has resulted in reducing the quantity of pinks hatched in British Columbia streams. It has been demonstrated through tagging operations that pinks pass through the Alaskan waters on their way to the Naas and Skeena districts, and even areas farther south.

The spawning conditions in the pink areas in the brood year of 1925 in the north, and particularly in the Central area, were not considered entirely satis-

factory, and in order that the toll during the year under review might not be such as to further deplete the supply of this variety, unusual precautions were taken by means of extensions of the weekly close seasons, an entire week's prohibition of fishing at the height of the run and early closing at the end of the season. These measures have undoubtedly produced good results, judging from the reports on the spawning areas—apart from the Central area—which have been received from the officers making annual inspections. Undoubtedly the pink situation will require to be well taken care of until it has recovered.

In the Fraser river district the pack of pinks was greater than in the brood year by approximately 3,000 cases, due to an enormous run.

Chums were very plentiful over most of the British Columbia coast during the year and the quantity taken amounted to 563,194 cases, compared with an average during the past five years of 567,741 cases. This total is eminently satisfactory, considering the fact that from two to three weeks of the best chum fishing at the height of the run was cut off, due to the unusual restrictions as a result of the enormous amount of fishing gear in the water. There is no doubt but that had not these unusual restrictions been put into force the pack of chums would have been a record one.

The previous warning to the industry to the effect that continued fishing operations would result in drastic conservation measures did not have the desired effect and each year the quantity of gear in the water has increased, and in addition the methods of operating purse-seines, for instance, have become much more efficacious.

The salmon gill-net licenses have increased during the past four years 53 per cent, salmon trolling 99 per cent, and salmon purse-seines 128 per cent. Obviously this keen and uneconomic scramble for the salmon, if permitted to continue unchecked, would in a very short time result in the serious depletion of the runs. Both the salmon fishermen and cannerymen appear to have finally reached the conclusion that this unreasonable competition can only result in disaster, and there would appear to be good reason to expect that the coming year will see salmon-fishing operations conducted on a more economical and reasonable basis.

The greatest difficulty, of course, is with the pink variety. The sockeye are being well taken care of and the coho and chums usually arrive at the spawning streams at a time when weather and water conditions are such as to permit a reasonable escapement. In the case of the pinks, however, the situation is much more difficult as they often arrive at the spawning streams in the hottest and driest time of the year. If there is not sufficient water in the streams, the salmon play about outside and are an easy prey to seines, unless practically a day and night efficient patrol is provided at every pink spawning stream in the province. With the proposed new measures in the way of cutting off inlets and moving out of boundaries, much assistance will be given towards conservation, but there can never be any assurance that it will not be necessary on short notice to close all fishing for pinks or even any other variety for considerable periods, in order to maintain the supply.

#### HALIBUT

The catch of halibut landed in British Columbia totalled 300,532 cwt. in 1927, as against 315,095 cwt. in the previous year. Statement No. 7 gives the total from 1913 to 1927.

It would not appear that the close season of three months each year during the past three seasons has had the effect of materially reducing the quantity landed.

Indications would seem to warrant the expectation that prices on the reopening of the season next spring will not be particularly attractive to the

fishermen. This is largely due to the fact that the stocks of frozen halibut have not been completely disposed of, and it is not likely that prices for the fresh article will be particularly satisfactory to the fishermen until the stocks of frozen halibut have been sold.

It has been suggested that the reason for the large stocks of frozen halibut is that the market in the east has turned of recent years to the several varieties of filleted fish produced on the Atlantic coast.

#### HERRING

As will be seen by statement No. 8, a very large percentage of the herring caught is drysalted and shipped to the Orient, the principal market being in China. Ten thousand four hundred and sixty-six tons were used in reduction works plants. In the vicinity of 2,000 tons is frozen each year at Prince Rupert, Butedale, Vancouver, and Kildonan for the purpose of bait for the halibut fishing. A smaller quantity is used fresh for the purpose and a comparatively infinitesimal quantity finds its way to the fresh fish markets and the smoke houses. Although efforts have been made to build up a paying business in the canning and also the Scotch curing of this variety, it has not been found profitable.

The interesting statement No. 8 gives the records of the drysalt herring pack from 1918-27. The fluctuation is not necessarily due to lack of supply, but is largely caused by the unstable market conditions in China, due largely to the internal troubles of that country. The supply of raw product naturally has fluctuated from year to year, but there is no evidence that the runs of herring to the British Columbia coast are becoming depleted in any way.

#### WHALING

The two stations at Naden Harbour and Rose Harbour at the northern and southern extremities of the Queen Charlotte Island group were operated again this year, with a catch of 258 whales as against a total of 269 for the preceding year.

Statement No. 10 covers the catch from 1918 to 1927.

#### FUR SEAL SKINS

Statement No. 11 shows a very large fluctuation in catches between the years 1912 and 1927. Prices naturally very materially influence the activities of the Indians, who are the only ones permitted under the Pelagic Sealing Treaty to take fur seal skins. During the last two years, for instance, the prices have averaged about \$8 per skin to the Indians, and in view of such small returns, the weather conditions during the migration of the fur seals, and the profitable business of trolling for salmon, the catch last year fell off 50 per cent. No doubt also the more efficient patrol which was available for the purpose of protecting the fur seals had something to do with keeping the total down.

#### DESTRUCTION OF SEA LIONS

On June 7, the C.G.S. *Givenchy*, equipped with a Lewis gun, long Ross rifles, .22 calibre rifles and .22 and .32 calibre automatic pistols (the smaller firearms being used primarily for the pups) and accompanied by Mr. W. E. Maiden, Secretary of the British Columbia Fishermen's Protective Association, an expert machine-gunner, left for the vicinity of the Virgin and Pearl rocks to again do what was possible during the pupping time of the sea lions to reduce their numbers. Considerable difficulty was again experienced owing to the heavy seas running, which made operations extremely difficult and hazardous, the

rookeries being very low and exposed to the full sweep of the Pacific ocean. Undoubtedly the use of short Lee-Enfield rifles would be much more efficient, in that they are shorter and lighter and more convenient to handle, in comparison with the Ross variety. It has not been possible to date, however, to obtain the Lee-Enfield.

The total number destroyed since the commencement of these operations is as follows:—

	1923	1924	1925	1926	1927	Totals
<i>Virgin Rocks—</i>						
Pups.....	649	903	1,067	565	635	3,819
Adults.....	1,111	1,333	1,520	877	858	5,699
<i>Pearl Rocks—</i>						
Pups.....	5	312	102	146	40	605
Adults.....	120	158	138	368	130	914
Totals.....	1,885	2,706	2,827	1,956	1,663	11,037

The officer commanding the expedition reports that yearlings and two-year-olds were found to be practically extinct, during the last hunt, which condition he attributes to the large number of pups killed during previous operations. He further states that the rocks were found to be practically monopolized by old sea lions of both sexes, but in numbers considerably less than in previous years. Mr. Maiden states that he observed fresh fish bones on the Virgin rocks on the date of one raid, but that these were not present on the date of the previous one. This he feels to be evidence to show that the sea lions were feeding on fish, although it is understood that during the pupping season these animals do not take food.

A sample of sea lion blood was obtained and forwarded to the Biological Station.

The fishermen in the vicinity again signified their approval of the hunting operations by means of gifts or cigars to the members of the crew.

#### PATROL SERVICE

In view of the immense increase in the number of fishermen and the quantity of fishing gear operated during the year, particularly in the case of salmon, and the resultant keen competition, the difficulties of the patrol service were largely increased and it is felt that if proper measures are to be taken looking to the conservation of our salmon supply, particularly, several of the present overseers' areas must be considerably reduced, and more of these permanent officers appointed. Each should be equipped with an efficient departmentally owned boat and these boats will require to be kept in commission a longer period each season in order that the overseers can give better attention to the immensely important problem involved in the inspection and care of the spawning grounds. During the fishing season the duties in the way of protection and other relative matters consume all the time of the overseers, and it is only after the season is over that it is possible for them to undertake a really satisfactory inspection of the numerous salmon streams in each area.

The inspections by guardians and patrolmen are very often unsatisfactory owing to the fact that these officers are usually new men each year. Obviously their lack of experience and information with regard to conditions of previous years detracts very greatly from the value of their reports. The only hope we have of obtaining satisfactory information is by keeping the overseers and several of the departmentally owned patrol boats on duty for considerably longer periods. Even by that arrangement the inspections cannot be entirely

satisfactory due to the fact that one officer cannot hope to thoroughly examine all salmon streams in his district during the time the salmon are spawning. This task is physically impossible.

Fortunately some seaplane service was provided and although not sufficient, at the same time the moral effect of there being even one plane available to the administration cannot be over-estimated, but if the industry finds that only the limited service which can be expected from one plane is available, it will soon realize the limitations and a considerable portion of the value of the moral effect will be lost. As evidence of the efficacy of the air service in the way of fishery protection, I would refer to the resolution presented at a recent fishermen's meeting in Prince Rupert to the effect that an adequate air service should be provided by the department for the protection of the fisheries, as the fishermen themselves felt it to be the most effective arm of the service.

The lowest possible minimum service consistent with reasonable results would be two planes capable of service at all times, which would obviously necessitate a third in reserve. Commencing with the opening of the fishing in the north, one plane is required with headquarters at Prince Rupert and another with headquarters in the vicinity of Swanson bay. Later one of these could probably be transferred to the Queen Charlotte island area and the other farther south to possibly Alert bay or Quathiaski cove. Much, of course, depends upon the class of aircraft used and it is necessary to have considerable speed, a high ceiling and the ability to withstand a certain amount of sea.

The service provided during the past year was fifty flying hours to start with, which amount was later increased by 42 hours, 2 minutes, making a total of 92 hours, 2 minutes. The distance travelled was approximately 5,223 miles.

The boat patrol service was taken care of by twenty-two Departmentally owned power boats, ninety chartered power boats and twelve row boats. The *Malaspina* during the season logged 18,958 miles and the *Givenchy*, 16,190. The latter boat was again used in connection with lifesaving on the west coast of Vancouver island with headquarters at Bamfield.

One of the patrol boats owned by the department, the F.P.L. *Cloyah* was destroyed as a result of an explosion in the engine room. The crew were fortunate in being able to make their escape in the tender, the engineer suffering severe burns about the face and hands.

For the purpose of replacing worn out patrol boats, tenders were called for three fifty-two footers powered with sixty-five horse-power Thornycroft reduction geared gas engines. It is hoped that by using this variety of engine there will be much less vibration and that the noise of the exhaust will not be such a handicap as in the case of the Diesel power boats. In these cases the exhaust can be heard a very considerable distance and is a warning to those breaking the fisheries regulations and gives them an opportunity to escape. It is also expected that the greater cost of fuel for the reduction geared gasoline engines will be more than offset by the lower cost of replacements in engine parts.

These three boats were designed and specifications prepared by Mr. J. W. Allen, Gas Engine Foreman, whose duties include looking after the annual overhaul and upkeep of the patrol boats, as well as seeing that the chartered boats give their proper performance. His knowledge is also utilized by other departments of the Government.

#### REGULATIONS

As was expected the salmon fishing particularly during the year became more intensive than ever in the past and this fact called for extraordinary measures to the end that a satisfactory supply of parent salmon might be permitted to reach the spawning grounds.

It became necessary to increase weekly close seasons for sockeye fishing in the northern areas from forty-eight to a total of fifty-seven hours on the Skeena river for two week ends, and during the whole of the fishing season on Rivers and Smiths inlets. For the purpose of saving the run of pinks which showed evidence of being light, a special close period from August 26 to September 4 was applied to all fishing gear, apart from salmon trolling in the whole of the province, with the exception of that area through which the salmon proceed in passing to the Fraser river spawning grounds.

At the end of the season, in order to save a reasonable quantity of chums and cohoes for the spawning areas, fishing in all of District No. 2 was finally stopped on September 23, with the exception of the Queen Charlotte Islands, where the date was set at October 7. These dates compare with October 15 and October 22 respectively in the previous season, the time allowed for fishing being reduced in 1927 by approximately three weeks.

In District No. 3 in addition to the special close period from August 26 to September 4, all fishing was closed from two to three weeks earlier at the end of the season.

The result of the above closures was that a comparatively satisfactory quantity of pink salmon were able to pass up to the spawning grounds, with the exception of certain portions of the Central area and in the Naas. An examination of the spawning grounds of the Skeena watershed showed a very considerable run of pinks had either succeeded in passing up the river during the special close season or were very late in arriving, which permitted their reaching the spawning areas.

An excellent supply of chums and cohoes was saved for the spawning streams over the whole province, with the exception of some of the streams on the Queen Charlotte Islands. The inspector for District No. 3 reports that the run of chums was unusually heavy through his district, particularly in certain portions of the west coast of Vancouver island, where the quantity was the largest on record.

On the Fraser river and in the waters through which salmon are obliged to pass heading for the Fraser, and the immediate vicinity, the weekly close period was increased from time to time very materially resulting in reasonably good spawning conditions.

There is no doubt but that had not these unusual precautions been taken the huge quantity of gear in the water and the intensity with which it was fished would have resulted in a very serious situation. The inspection of the spawning areas, however, showed that the extra restrictions had obtained the desired result.

If the industry continues to place such huge quantities of gear in the water, then the fishing restrictions must be greatly increased, even at the expense of profits to fishermen and canners. The fish must be given the benefit of the doubt from a conservation standpoint. In any event, it is imperative that certain inlets be cut off entirely, that salmon purse-seines be reduced in size and that all fishing be kept farther out from the mouths of streams.

#### VIOLATIONS OF FISHERY REGULATIONS

There were one hundred and sixty-six prosecutions entered for violations of the fishery regulations during the season. Particulars of these will be found in appendix No. 8.

#### POWER BOATS IN SALMON GILL-NET FISHING DISTRICT NO. 2

Although there was an increase of 549 salmon gill-net licenses issued in District No. 2, the number of power boats used in these operations increased

only 45, being 630 as against 576 for the preceding year. The above total compares with 85 only used in 1924. Only white British subjects and Canadian Indians are permitted to operate power boats in District No. 2 in salmon gill-net operations.

#### CLEARING OBSTRUCTIONS IN SALMON STREAMS

Each season as this work is extended the necessity for it becomes more apparent. An endeavour is made to have a thorough examination of every salmon stream in the province once a year, but this has been found very difficult owing to the fact that officers are required to supervise such large districts, and the conditions in the wild country through which the inspection has to be conducted are so arduous as to consume a great deal of time and is expensive. Every obstruction which is reported either by the fishery officers or the fishermen or from any source is immediately investigated and if it is possible for the local officer to do what is necessary, his instructions are to always take out the obstructions. If however, assistance is required such is provided in the way of men, powder or other facilities, and if the conditions warrant, an inspection is made at the first opportunity by one of the engineers and arrangements made for the most practical way of dealing with the situation. Much time is lost, however, in inspections resulting from reports by people who are not sure of their information. Again, log jams for instance which would appear to many observers to be an obstruction to the ascent of salmon often prove to be just the reverse, and while not impeding the progress of the parent fish to the spawning grounds, are often a protection to the young fish coming down and serve also as collectors of food for the young.

At Hells Gate canyon in the Fraser river conditions since the clearing away of the slide which occurred in 1913 have remained unchanged and those who have been in the best position to know, have felt that the salmon runs have all succeeded in passing up to their spawning grounds, although, due to unfavourable stages of the water, there may have been hours or even days when they were delayed. In spite of several reports to the effect that the fish were permanently blocked, or were so badly damaged at the Gate as to prevent their reaching the spawning grounds in fit condition there would appear to be no doubt but that the salmon did get through this obstruction, at least, until the very last runs of the seasons 1926 and 1927. In fact, there is every reason to believe that all the 1926 run succeeded in passing this point. However during the last two seasons there has developed an unusually late run of sockeye which has arrived at Hells Gate in a very advanced stage towards spawning. The condition of this run in the fall of 1927 was found to be even worse than that of the preceding season and whilst there was no unassailable evidence to justify the conclusion that any run was permanently prevented from ascending, there is very considerable doubt as to whether the latest run of 1927 did actually succeed. It has been suggested that the lack of male fish in the Kakawa lake spawning area for instance, which is tributary to the Coquihalla system, is evidence that they were probably able to pass Hells Gate, but that the female, being weaker, were obliged to turn back and passed up to the Kakawa lake spawning grounds. It is hoped that investigations will divulge the facts in this matter in the very near future.

Following the experiences of 1926 it was felt that in order that there might be absolutely no doubt as to conditions at Hells Gate being as good as they could possibly be made for the ascent of salmon, the department arranged for a board composed of civil engineers in the employment of the several branches of the federal and provincial governments in British Columbia to study the situation and advise as to whether in its opinion conditions could be improved. Obviously, considerable time is required for such a study in order that it may

be thorough and the results conclusive. It is expected that early in the season of 1928 a report from the board will be available to the department. The engineers' report in more detail will be found in appendix No. 4.

#### MEETING OF OVERSEERS

The practice of gathering together before the fishing season each year all the inspectors, overseers and a number of guardians for a conference of several days at the office of the chief inspector in Vancouver is proving its value more and more each season, and it is the intention to continue these meetings.

#### FISH MEAL AND OIL OPERATIONS

Four additional licenses for reduction works plants were issued during the year, making a total of twenty-seven in all. This business has proved to be fairly profitable generally speaking and should continue to be one of the most important branches of the fishing industry of the province. Pilchards again composed a very great percentage of the raw product processed, although herring were permitted to be used for this purpose up to December 31 on the west coast of Vancouver island, north of Barclay sound, and in District No. 2. In addition the offal from salmon canneries and freezing plants as well as whale carcasses are used in these operations.

An earnest effort was made by several of the operators to obtain their supply of pilchards in the open seas, instead of waiting for them to enter inlets as has been done heretofore. Fishing outside, however, requires specially equipped boats and unusually strong gear, but due to weather conditions the experiments were found to be unprofitable.

Statement No. 9 shows the total production of fish meal and oil since 1920.

#### MARINE WAYS AND WAREHOUSE

The department maintains a well-equipped machine shop and ways on the Fraser river at Poplar Island, New Westminster, where many of the departmentally owned boats receive their annual overhaul and are repaired from time to time during the season. It has been found that the facilities so provided have been the means of saving a good deal of money and have increased the efficiency of the service generally. The patrol boats of the Fraser river use the floats at this station and some others from outlying points are also laid up there when out of commission. This, of course, does not apply to the boats of the northern district, which are brought at the end of the season to Digby island at Prince Rupert. Unfortunately, however, at that point there is no adequate accommodation provided for the protection of the department's valuable fleet, and it is hoped that in the very near future proper facilities will be provided.

#### UNNATURALIZED WHITE RESIDENT FISHERMEN

The department's policy which permits white immigrants who have recently come to the country to take out fishing licenses on the production of the proper evidence to the effect that they are in fact permanent residents and will become naturalized just as soon as the law will permit has resulted in, up to the end of 1927, the issuing of 1,046 such licenses, to 940 fishermen.

#### SPORT FISH

The protection of the sport fish, particularly in the interior of the province, is becoming more difficult each year, due largely to the opening up of good motor roads and the resultant increased tourist traffic in the province. With

the machinery at present available, it is absolutely impossible to adequately protect the fish of the interior waters. The proper organization in the way of overseers or guardians, or both, will undoubtedly materially increase the expense of the British Columbia administration, but such additional expense is absolutely imperative if this valuable asset is to be properly conserved.

#### SPECIAL INQUIRY INTO SALMON FISHING CONDITIONS

As a result of conditions brought about by the excessive amount of salmon fishing gear in the water which caused very necessary curtailment of fishing operations for purposes of conservation, the industry, both fishermen and canners, felt that conditions warranted approaching the department with a view to the appointment of a commission to inquire into the British Columbia situation. It was contended that under the conditions existing salmon fishing operations were proving unprofitable to both fishermen and canners.

It was felt, however, by the department that the time was not opportune for the appointment of a commission, particularly in view of the fact that the federal authority with regard to control of certain branches of the fishing industry had been challenged and the question referred to the Supreme Court of Canada for an opinion. It was decided, however, that as the Director of Fisheries was on the coast at the time, he should arrange for public hearings with a view to enabling all those interested to express their views on certain specific proposals which were finally submitted by certain canners who approached the department on behalf of the Salmon Canners' Association.

The delegation composed of fishermen and canners who approached the department explained that, while it might be expected that those engaged in fishing operations should remedy the situation themselves, they found it impossible under the existing regulations to agree on any plan, but expressed confidence that in the light of the season's experience the fishermen, as well as canners, would favour certain modifications in the regulations which, while not involving refusal of licenses to any, would enable the industry to do its utmost, at its own instance, to make reasonable reductions in the amount of equipment used, and otherwise reduce the cost of operations.

The delegation felt that this could be done if the regulations included provisions to the following effect:—

- (1) That the coast of British Columbia be divided into fishing areas of such proportion as to support the plants in these areas.
- (2) That the maximum amount of gear to be fished in each area before additional weekly or annual closed season would be added be stated in the regulations.
- (3) That salmon—except the catches of trollers or fish for export, fresh fish markets or cold storage—be processed in the area in which it is caught.

With a view to obtaining the opinion of the industry generally on the above three proposals, meetings were held at Prince Rupert, Alert Bay, Campbell River, Union Bay, Nanaimo, Port Alberni, Pender Harbour, Vancouver, and New Westminster.

No definite action was possible, however, by the department before the expiration of the calendar year, in view of the fact that the Prince Rupert fishermen asked for more time for consideration of the several proposals.

#### TAGGING OF SALMON

The information which is obtainable from the tagging of salmon is of such immense importance that the program should, without delay, be extended to cover all varieties of salmon and at as many favourable points as it is possible

to obtain the fish. Each season the necessity for obtaining such information becomes more apparent, and the result of a really comprehensive system as above suggested would enable conservation measures to be taken in a much more intelligent manner. The importance of this matter cannot be too strongly stressed.

#### STAFF

During the year the following was the personnel employed in the administration of the fisheries in the province of British Columbia:—

Inspection and clerical staff.....	28
Overseers.....	18
Guardians.....	36
Patrolmen and boat crews.....	214
Fish culture.....	73
	<hr/>
	369

#### REPORT ON SALMON SPAWNING AREAS, BRITISH COLUMBIA

##### *Queen Charlotte Islands*

At Masset inlet, Naden harbour and the north coast of Graham island generally, the water conditions when the salmon arrived were favourable. The sockeye run, which in this area is an early and small one, was normal and appeared to reach the spawning grounds somewhat earlier than usual. This being the off year for pinks there was no showing of this variety. Chum salmon were late in arriving which fact, added to the unusual early closing of the commercial fishing, enabled very satisfactory quantities to reach the spawning grounds.

At Skidegate inlet several of the streams were fairly well seeded, but on the whole the quantities reaching the spawning areas were not satisfactory.

Along the east coast of the Queen Charlotte islands south of Skidegate, the supply of salmon reaching the spawning areas was, in the opinion of the inspecting officer, not sufficient.

##### *Nass River Area*

The annual inspection of the Meziaden watershed of the Nass river revealed evidence of a very small run of early sockeye. A late run, however, materialized, which, with the favourable water conditions present, will provide a fair natural seeding, but it is doubtful whether it will offset the lack of early salmon.

The spring salmon run also was not up to the average and the fish appeared to be smaller in size than usual. Cohoes had not arrived in appreciable numbers at the time of the inspection. Climatic conditions appeared to be about one month later than usual.

The pink run to the lower areas of the system was very light.

##### *Skeena River Area*

The examination of the Babine Lake district, which is the main spawning area of the Skeena watershed, showed quite a good supply of sockeye. At Morrison Creek, for instance, on which the hatchery is situated, the run was estimated by the superintendent to be 25 per cent greater than that of the previous year. An examination of the sockeye streams tributary to Babine lake showed conditions on the whole quite satisfactory.

At Lakelse Lake conditions were found to be far from satisfactory and it was not possible to obtain sufficient sockeye eggs to fill the hatchery. It is difficult to account for this situation unless it was due to the particular tribe of salmon heading for Lakelse arriving in Chatham sound and Skeena river at the height of the fishing season and being mostly caught. From conditions found on the Lakelse spawning grounds in the brood years the small return was not expected.

In the case of pink salmon the catch in the river and Chatham sound was very considerably below normal. An examination of the spawning grounds in the Babine river, however, which is probably the most important area from the standpoint of this variety, showed them to be unusually well seeded with pinks. The guardian states that while the usual portion of the river used by these salmon was probably more heavily seeded than during the last few years, additional areas of the river were also heavily seeded so that the run of pinks to the Lower Babine during 1927 was the greatest that he had ever known.

The supply of cohoes was well up to the average.

#### *Central Area*

The sockeye running to this area are mostly of the creek variety utilizing the numerous small streams which drain a limited area. During the period of dry weather these streams dry very rapidly and conditions as a result for fish ascending to the spawning grounds are very difficult, and at times impossible, necessitating drastic regulations to prevent the runs being depleted.

The overseer reports that the sockeye run on the whole has been satisfactory, and that the coho streams were well seeded. Due probably largely to the unusual amount of close period enforced during the year, very considerable quantities of chums were enabled to ascend the streams. In the case of pink salmon however, the supply was very disappointing and few streams only can be said to be well seeded. This condition will require special attention during the fishing season of 1929.

#### *Bella Coola and Kimsquit*

The run of sockeye to the Bella Coola portion of the district was again good during the year. It was later than usual, however in reaching the lakes. The supply each year since 1924 has been good. At Kimsquit, however, the sockeye run is reported as having been considerably below average. The spawning areas were not well seeded.

The run of springs was late at Bella Coola and although there was not a large quantity caught, yet there was a very satisfactory escapement to the spawning grounds. This condition was no doubt partly due to the early closing of fishing. The supply of this variety in the Kimsquit river was not satisfactory.

It is estimated that the supply of coho ascending the rivers at the head of Bella Coola and Kimsquit was not sufficient to adequately seed the respective spawning areas.

In the case of pinks there was a reasonably good showing at the head of Burke channel, but an inadequate supply at the head of Dean.

The run of chums was not good to either of these points.

The fluctuation in the supply of salmon at these two points is affected very materially by unusually severe freshets which cause the rivers to frequently change their course and which often scour out the spawning grounds.

The conditions in the lower portions of both Burke and Dean channels are such as will necessitate some further action looking to conservation.

#### *Rivers Inlet Area*

This is primarily a sockeye area and the usual inspection justifies the statement that the spawning grounds were well seeded with this variety. In spite of the intensive fishing in the Inlet the run is being satisfactorily maintained and there would appear to be no reason to fear depletion.

#### *Smiths Inlet Area*

There appears to be no doubt but that the supply of sockeye reaching the spawning grounds in Smiths inlet during the season has been eminently satisfactory and with the present fishing regulations and boundaries there should be no fear for future supplies.

### *Alert Bay District*

The main sockeye areas are the Nimpkish river and Glendale cove. Notwithstanding the intensive fishing by purse-seines and drag-seines at Nimpkish restrictions in force each year are resulting in large quantities reaching the spawning grounds. The season under review was no exception and although the pack of this variety amounted to approximately 9,000 cases an abundance of fish safely passed up the river. At Glendale cove the supply was not so satisfactory.

Water conditions in the area generally resulted in the streams being sufficiently high to permit all varieties of salmon to pass up to the spawning grounds instead of being delayed at the mouths of creeks. The runs of pinks on the whole were light. Conditions, however, were better in the case of cohoes and also the chum salmon. The early closing undoubtedly had the effect of permitting an abundant supply of both these varieties reaching their spawning grounds.

### *Quathiaski District*

This is not an important sockeye area although there is a run to Phillips arm, Port Neville and another to Hayden bay, the latter being composed of very small fish, however. The supply was light. The run of cohoes cannot be said to be satisfactory, although good at Orford river at the head of Bute inlet where the gillnet fishermen had a successful season. The supply of pinks at Orford river is reported by the overseer as the best he has seen in that district. In other portions of the area, however, the supply of this variety was not satisfactory.

To such rivers as the Homalko, Orford, Village Bay, Hayden Creek, the supply of chums was very good. In other portions of the district, however, conditions were not satisfactory.

### *Comox District*

This is not a sockeye area. In the case of the cohoes, the spawning grounds were not well seeded with the exception of the Puntledge and Tsolem rivers. This was the off year, however, for pinks and no run of any material size was expected. Quite a satisfactory supply of springs passed up the Puntledge river and the fishway in the stream at the outlet of Comox lake appeared to be no obstacle to the ascent. The chum supply was good in the Puntledge river, Waterloo creek, Cooks creek, Big Qualicum river and Englishmen's river.

It is expected that the new regulations which will be enforced in the Comox area will result in a greater supply of the several varieties reaching the spawning grounds.

### *Pender Harbour District*

This is not a sockeye area apart from a small run proceeding to Saginaw which apparently is being well maintained. The supply of pinks on the whole was good and there would appear to be no doubt but that a portion of the large run coming north through Puget sound in the odd number years proceeds to the Pender Harbour district, particularly to the vicinity of Jervis inlet. The overseer observes that at Toba inlet, Theodosia arm and in two of the streams in Jervis inlet the run can be said to have been far better than any since 1924, which is the year he assumed patrol of the district. Owing to the continued heavy rains throughout the season the pinks were able to ascend the streams easily and the catches by the purse-seines were lighter than usual, as the fish did not school up at the mouths of the creek as is the case in the dry weather.

The run of chums on the whole was also a good one and the high water in the streams permitted an abundance of fish to reach the spawning grounds. This also applies to the cohoes.

*Nanaimo District*

The inspecting officer reports that, generally speaking, the run of cohoes and chums was better than any season during the past ten years. Heavy runs and the early closing regulations permitted large quantities to ascend to the spawning grounds. The supply of spring salmon and steelhead trout was also satisfactory.

*Cowichan District*

The supply of spring salmon running to the Cowichan river was below normal. This fact is attributed in part at least to the water conditions in the river four years previously, when the Cowichan and all streams in the district were abnormally low. In that year the superintendent of the Cowichan Lake hatchery was obliged to come down as far as Duncan for spring salmon eggs as no fish could pass above Skutz falls. During the next three years however, the run of springs has been good and the water conditions also satisfactory.

The supply of the several varieties of sporting fish is reported as having been excellent.

*Sooke District*

A satisfactory supply of chums and cohoes reached the several streams in this area and were able to pass up to the spawning grounds. The local guardian reports the supply as being heavier than for the past three or four seasons.

*Alberni District*

This area includes Stamp river and Sproat river, Anderson river in Barclay sound, and Hobarton and Cheewat rivers in Nitinat inlet, all of these being frequented by sockeye. The overseer reports the season as being a banner one for the district. 79,069 sockeye were canned and some 12,000 fish of this variety were shipped to Vancouver for processing. Undoubtedly this desirable condition has been brought about by the efforts of the department in the way of fishery regulations, coupled with fish culture. The runs of sockeye to the Sproat and Stamp rivers has been increasing very materially of recent years and in view of the fact that an adequate fishway has been installed at the Stamp River falls there is every reason to believe that there will always be a very good run of this variety to the district. The supply reaching Anderson lake where the hatchery is situated was estimated by the superintendent at 80,000 spawning fish, a most encouraging figure.

The run of spring salmon was the best in years, the supply of cohoes also being good. In the case of the chums, in spite of the season being closed two weeks earlier than usual the record total of 1,155,569 fish was taken. The streams were in good condition and the salmon had no difficulty in ascending to their spawning grounds.

The streams flowing into Nitinat inlet were generally speaking well supplied with salmon.

*Clayoquot Sound*

The main stream is the Kennedy river draining Kennedy lake, where a hatchery is maintained. For some reason or other there was a small supply of sockeye on the spawning grounds. The pack taken by the several seines operating in Clayoquot sound opposite Kennedy river accounted for a little over 4,000 cases which is an average pack for the district. It would appear that four years hence unusual methods must be taken to further protect this run.

Practically all the streams in the Clayoquot sound area were heavily seeded with both cohoes and chums. Altogether it would appear to have been an eminently satisfactory season from the standpoint of spawning fish. The overseer comments that the quantity of chums was the largest ever observed in that district. This is not a pink area.

*Nootka District*

The fall varieties are the only ones frequenting this area apart from a small run of sockeye to Gold river. The supply of springs on the spawning grounds of the Burman and Gold rivers was satisfactory. Other portions of the district, however, were not so good. The coho supply was not up to average apart from such points as Deserted creek, Tahsis river and Queens cove.

In the case of chums the run was a heavy one to practically all streams. This is not a pink area.

*Kyuquot Sound District*

No sockeye run to this district apart from the stream at the head of Ou-Ou-Kinch inlet where a very fair run was observed between May and August, and Easy creek, where only a few were observed.

The supply of spring salmon was considerably below normal and unsatisfactory. The same might be said of the coho. In the case of chums, however, a good supply reached the spawning grounds. This is not a pink area.

*Quatsino District*

There are no sockeye in this area apart from a few of the early creek variety. The supply of cohoes was only fair. The chums, however, although light at first, finally developed into a good run, which owing to the high state of the streams, and the early closing of fishing were able to reach their spawning grounds.

*Fraser River Watershed*

The officers in the Stuart lake area, while not reporting any large body of sockeye, undoubtedly observed a quantity which was a fair average of the last five years. The greatest number appear to have passed up to Trembluer and Takla lakes, tributary to the Stuart.

In the Francois Fraser lake system there have been very few sockeye observed for years, and the officer reporting for the season under review mentions schools of from four to fifty at separate points. The number can be considered a fair average.

In the Quesnel lake system conditions were found to be better than usual. During the past two or three years indications have justified the conclusion that the quantity of spawning fish was increasing, although compared with the huge runs of the big years previous to the slide at Hells Gate, the quantities observed in recent seasons are infinitesimal. However, during the fall of 1927 our inspecting officer, instead of reporting schools of twenty, thirty and forty as reported during previous years, observed as many as 3,000 sockeye in one hole in the Horsefly river in the vicinity of Black creek, some thirty miles above Quesnel lake. He estimates that he personally saw between six and seven thousand fish during his inspection which is a much more encouraging report than has been received since the big runs.

The Chilco area shows no improvement over recent years. The Shuswap area again received a very good supply of spawning sockeye in the Adams and Little river districts. The run was again late and while not as large as the preceding year was most encouraging. No sockeye were observed above the Adams river. Indications along the shores of the south Thompson river were better than for a good many years, one large ranch owner stating that it was the first season for a considerable number of years that he has been obliged to prevent his hogs approaching the river owing to the fact that there were such large quantities of dead salmon along the shores.

At Bridge River canyon in the Fraser the guardian reports that no unusually large run of sockeye passed through his area, notwithstanding the large quantities which have been observed from time to time until quite late in the season at Hells Gate. The fishway which was recently improved is proving an entire success.

At Hells Gate sockeye salmon were observed on the 14th of July for the first time, this season, and from time to time arrived in considerable quantities

until very late in the season—in fact sockeye were observed below Hells Gate as late as December 14. There appears to be no reason to doubt that these all passed up beyond Hells Gate with possibly the exception of the very latest runs which arrived in a very advanced condition and appeared to be very weak. Although an unusually careful watch was maintained there was no evidence found to warrant the statement that the conditions at the Gate obstructed the passage of fish at any time permanently. As has always been the case, there are hours or days when, owing to the stage of the water at that time, salmon are delayed but they have finally succeeded in passing through. It will be remembered that in the fall of 1926 a similar run of late sockeye in an advanced stage reached Hells Gate but succeeded in passing through and were later observed on the spawning grounds of the Adams and Little Rivers in the Shuswap area.

It has been suggested that the unusually large quantity of sockeye observed in Kakawa lake and creek which are tributary to the Fraser through the Coquihalla were some which had found conditions at Hells Gate too difficult and returned to the Coquihalla exhausted. As confirmation of this contention it has been pointed out that 99 per cent of this variety observed in the Kawkawa lake district were females. The suggestion is that the males, being stronger than the females, were able to make the ascent, whereas the females were obliged to back down to the Coquihalla. This suggestion is not concurred in by those who have had most experience with fish culture operations, and it has always been understood that the sockeye will continue to battle their way up stream until they either succeed or die. An effort is being made to determine just what merit there is in the contention that this year's Kawkawa fish are those which had returned from Hells Gate. Additional weight is given to this suggestion as it has been stated that the sockeye which appeared this year at Kawkawa lake are from a pound to a pound and a half heavier than the native fish.

The Cultus and Chilliwack lake system showed an unusually large run of sockeye, particularly the former, where over 80,000 spawning fish were passed over the hatchery fence, all being allowed this year to spawn naturally. The same satisfactory conditions existed in this locality with regard to pinks, although the supply of chums and cohoes was not so good.

At Harrison lake there was no large quantity of sockeye observed although nearly four million eggs were obtained from those arriving in the vicinity of the hatchery. These eggs were transferred to Cultus lake to be brought back when eyed and planted in the Morris creek district. At Morris creek the run was disappointing. On the other hand there was a large run of pink salmon in the Harrison district and a very satisfactory supply of springs.

In the Pitt lake district the superintendent of the hatchery reports that the run of sockeye to the system was at least 25 per cent larger than for many years, and all the spawning grounds were well seeded. Conditions were not so satisfactory, however, in the case of the other varieties of salmon.

In the Birkenhead system where a hatchery is maintained, there was the usual large run of sockeye and there were no indications which would justify anything but optimistic expectations for the future.

In the Howe sound and Burrard inlet areas there was a very large run of pink salmon, unusually large for even the big year. The run proceeding to Indian river was not fished after entering Burrard inlet. The spawning grounds in both areas are heavily seeded. The supply of chums and cohoes was a fair average of recent years, the chums particularly being very numerous on the spawning areas at the head of Howe sound, due no doubt largely to the early closing of the fishing.

The run of pink salmon generally to the Fraser river, Burrard inlet and Howe sound, also Jervis inlet areas, which mostly passes through the straits of Juan de Fuca, was an excellent one.



1907.....	58	.....	.....	.....	314,074	23,159	.....	2,039	.....	87,900	118,704 (Pks. & Ch.)	547,459
1908.....	52	.....	.....	.....	355,023	25,433	.....	2,731	.....	81,917	76,448 (Pks. & Ch.)	542,689
1909.....	72	.....	.....	.....	840,441	18,218	.....	799	.....	61,918	46,544 (Pks. & Ch.)	967,920
1910.....	58	.....	.....	.....	565,915	19,313	.....	9,476	.....	74,382	34,613	702,201
1911.....	59	.....	.....	.....	383,509	38,751	.....	9,705	.....	119,80	305,247	948,965
1912.....	57	3,640	.....	92	444,762	62,345	.....	18,092	.....	165,309	247,743	996,876
1913.....	78	4,782	.....	74	972,178	37,433	.....	3,616	.....	69,822	192,887	1,353,901
1914.....	63	4,857	.....	61	536,696	32,908	.....	16,420	.....	120,201	220,340	1,111,039
1915.....	63	4,951	.....	61	476,042	51,734	.....	6,370	.....	146,956	367,352	1,133,381
1916.....	72	4,600	.....	80	214,789	51,231	.....	15,495	.....	183,623	280,644	995,065
1917.....	94	5,286	1,370	99	339,848	48,030	.....	27,046	11,740 B.B.&SH.	157,589	496,759	1,537,485
1918.....	88	5,073	1,786	122	276,459	65,535	.....	41,819 Pk. & Wh.	15,916 B.B.&SH.	191,088	527,745	1,616,157
1919.....	82	4,598	2,260	139	369,445	73,179	.....	9,077	24,323	175,670	346,639	1,393,156
1920.....	65	4,761	1,855	155	351,405	95,983	.....	8,441	8,061	101,972	520,856	1,187,616
1921.....	56	4,777	1,452	59	163,914	36,725	.....	6,001	7,000	117,288	192,906	603,548
1922.....	64	4,491	1,513	143	299,614	21,163	.....	11,913	6,431	102,845	581,979	1,290,326
1923.....	61	3,957	1,446	223	334,647	17,539	.....	4,858	7,097	112,044	440,932	1,341,677
1924.....	62	3,696	1,553	242	369,601	18,741	.....	2,591	4,267	115,944	657,561	1,747,505
1925.....	65	4,225	1,821	329	392,643	39,142	.....	4,419	10,675	188,505	445,400	1,730,622
1926.....	76	4,750	2,416	445	336,995	41,276	.....	4,177	23,736	162,449	772,993	2,065,198
1927.....	76	5,637	3,093	555	308,032	34,029	.....	8,819	20,830	161,148	247,617	1,360,449

NOTE.—Licenses issued 1923, 1924, 1925, 1926 and 1927 include transfers from one district to another.  
 \*For the years 1876 to 1901 and 1903—particulars of varieties not available—practically all sockeye.

## PACK OF CANNED SALMON ON THE NAAS RIVER—\*1876 TO 1927

Year	Num- ber of can- neries oper- ated	Number of salmon licenses issued				Sockeye	Red Spring	Pink Spring	White Spring	Blue- backs	Steel- heads	Cohoos	Pinks	Chums	Totals
		G.N.	Troll	P.S.	D.S.	T.N.									
1876	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1877	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1878	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1879	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1880	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1881	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7,700
1882	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16,100
1883	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20,383
1884	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,500
1885	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1886	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1887	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1888	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12,318
1889	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,410
1890	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23,908
1891	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10,323
1892	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25,434
1893	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15,190
1894	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,587
1895	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,550
1896	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,649
1897	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	20,847
1898	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,953
1899	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,443
1900	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,238
1901	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14,790
1902	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23,318
1903	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12,100
1904	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19,085
							20,953	(Other varieties:	2,365						
							15,000	2,357	(Red & Wh. Spr.)	.....	.....	1,697	31	.....	.....





1909	12	87,901	11,727	742	12,249	28,130 (P.k. & Ch.)	140,739
1910	12	187,246	9,546	239	11,531	13,473	222,035
1911	12	131,066	15,514	2,428	23,376	81,956	254,410
1912	12	92,498	19,332	4,501	39,835	97,588	254,258
1913	13	52,927	23,250	3,186	18,647	66,045	164,055
1914	13	130,166	11,529	211	16,378	71,021	237,634
1915	13	116,553	15,069	204	32,190	107,578	279,161
1916	14	60,923	18,372	2,561	47,409	73,029	223,158
1917	15	65,760	13,586	2,690	38,456	148,319	292,219
1918	15	123,322	16,013	6,828	38,759	161,727	374,216
1919	14	184,945	19,661	3,624	36,559	117,303	398,877
1920	15	90,869	37,403	2,198	18,068	177,679	334,392
1921	13	40,018	18,599	445	45,033	124,457	234,765
1922	13	100,615	7,080	1,805	24,673	203,555	362,055
1923	13	131,731	8,863	418	31,967	145,973	338,863
1924	13	144,732	9,511	1,301	26,907	131,338	390,967
1925	13	77,785	17,811	2,457	38,079	127,226	76,352
1925	15	81,149	19,185	2,403	39,168	130,083	348,866
1926	15	82,307	17,896	1,750	30,153	170,586	350,804
1926	15	82,357	17,896	1,750	30,209	210,064	407,533
1927	13	83,988	13,595	1,609	25,209	38,903	177,173
1927	13	83,984	14,556	1,609	25,623	38,761	187,639

\*Approximately.

†Pack of fish caught at Skeena River regardless where canned.

‡Pack at Skeena River regardless where caught.

NOTE.—Licenses issued 1923, 1924, 1925, 1926 and 1927 include transfers from other districts.

\*For the years 1877 to 1903. Particulars of varieties not available—practically all sockeye.







1906.....	24	1,746	.....	.....	.....	6,503	.....	1,070	.....	34,413	15,543 (Pk. & Ch.)	240,486
1907.....	18	1,726	.....	.....	.....	3,448	.....	557	.....	35,766	63,530 (Pk. & Ch.)	163,116
1908.....	16	1,374	.....	.....	.....	1,427	.....	18	.....	24,198	415 (Pk. & Ch.)	89,184
1909.....	38	2,688	.....	.....	.....	549,248	.....	.....	.....	21,540	1,987 (Pk. & Ch.)	567,203
1910.....	21	1,577	.....	.....	.....	133,045	.....	8,925	.....	27,855	128	223,148
1911.....	15	1,396	.....	.....	.....	58,487	.....	6,751	.....	39,740	142,101	301,344
1912.....	15	1,430	.....	2	.....	108,784	.....	8,373	.....	38,574	574	173,921
1913.....	35	2,560	.....	.....	.....	684,596	.....	49	.....	11,848	9,973	732,059
1914.....	20	2,686	.....	.....	.....	185,483	.....	14,000	.....	38,639	6,057	328,390
1915.....	22	2,616	.....	.....	.....	89,040	.....	3,532	.....	34,114	128,555	289,119
1916.....	21	2,240	.....	.....	.....	27,384	.....	9,217	.....	24,580	840	106,440
1917.....	29	2,626	.....	.....	.....	123,614	.....	18,916	.....	25,895	134,442	377,988
1918.....	18	1,587	.....	.....	.....	16,849	.....	24,274	.....	40,111	18,388	206,003
1919.....	14	1,337	.....	1	.....	28,628	.....	3,592	.....	39,253	39,363	158,718
1920.....	11	1,288	.....	.....	.....	44,598	.....	2,204	.....	22,934	12,839	132,860
1921.....	13	1,437	.....	.....	.....	35,900	.....	5,480	.....	29,978	8,178	103,917
1922.....	10	1,296	.....	.....	.....	48,744	.....	3,867	.....	29,578	17,895	137,482
1923.....	11	964	.....	.....	.....	28,423	.....	3,615	.....	20,173	63,645	224,637
1924.....	9	969	.....	.....	.....	36,200	.....	4,056	.....	21,935	31,968	209,050
1925.....	10	969	.....	.....	.....	31,523	.....	25,482	.....	36,717	99,800	272,993
1926.....	10	1,063	.....	.....	.....	83,589	.....	20,130	.....	21,787	32,256	273,134
1927.....	10	1,249	.....	.....	.....	57,085	.....	10,493	.....	24,079	102,535	280,013

NOTE.—Licenses issued 1923, 1924, 1925, 1926 and 1927 include transfers from other districts.  
 \*For the years 1876 to 1901, particulars of varieties not available—practically all sockeye.

## STATEMENT No. 6

## PACK OF CANNED SALMON OF PUGET SOUND FROM 1887 TO 1927

Year	Number of canneries operated	Spring	Sockeye	Coho	Chum	Pink	Steel- head	Total
1887.....		Partic	ulars of vari	eties not a	available.			22,000
1888.....	4							21,975
1889.....	2	240		7,480	1,145	2,890		11,674
1890.....	1	1,000		3,000	4,000			8,000
1891.....	2	382	5,538	5,869	3,093	5,647		20,529
1892.....	2	86	2,954	7,206	16,180			26,426
1893.....	3	1,200	47,852	11,812	11,380	17,530		89,331
1894.....	3		41,781	22,418	22,152	9,049		95,400
1895.....	7	1,542	65,143	50,865	38,785	23,633		179,968
1896.....	11	13,495	72,979	82,640	26,550			195,664
1897.....	12	9,500	312,048	91,900	23,310	57,268		494,026
1898.....	18	11,200	252,000	98,600	38,400			400,200
1899.....	19	24,364	499,646	101,387	31,481	252,733		919,611
1900.....	19	22,350	229,800	128,200	89,100			469,450
1901.....		Partic	ulars of vari	eties not a	available.			1,380,590
1902.....	21	30,049	372,301	85,817	93,492			581,659
1903.....	22	14,500	167,211	103,450	12,001	181,236		478,488
1904.....	13	14,441	109,264	118,127	49,656			291,488
1905.....	24	1,804	825,453	79,335	41,057	70,992		1,018,641
1906.....	16	8,139	178,748	94,497	149,218			430,602
1907.....	14	1,814	93,122	119,372	50,249	433,423		698,800
1908.....	22	95,210	170,951	128,922	47,607	6,075		448,765
1909.....	11	13,019	1,097,904	143,133	53,688	370,993		1,632,949
1910.....	24	10,064	248,014	162,755	146,942	108		567,883
1911.....	15	21,823	127,761	256,124	104,321	1,046,992		1,557,029
1912.....	20	20,252	184,680	149,727	60,760	700		416,125
1913.....	22	1,234	1,673,099	61,019	56,225	791,886		2,583,463
1914.....	31	26,044	335,230	151,893	278,801	892		792,860
1915.....	41	28,466	64,548	180,783	411,724	583,649		1,269,206
1916.....	32	37,030	84,637	155,832	427,878	1,887		707,278
1917.....	45	57,543	411,538	114,276	216,285	1,124,884		1,921,554
1918.....	32	63,366	50,723	235,860	267,538	6,605	106	624,198
1919.....	35	68,542	64,346	210,883	525,541	421,215	5,076	1,295,626
1920.....	11	25,846	62,654	24,502	48,849	4,669		166,520
1921.....	23	25,567	102,967	89,412	30,831	404,713		653,490
1922.....	16	20,615	48,566	111,711	65,552	2,225		248,729
1923.....	18	15,777	47,402	122,000	97,081	475,849	29	758,138
1924.....	12	19,968	69,369	87,879	134,360	5,945	128	317,644
1925.....	23	28,268	106,064	171,587	41,635	555,848	141	903,543
1926.....	14	27,763	44,569	120,846	112,411	2,125	63	307,778
1927.....	21	43,443	96,343	133,528	37,414	585,506	216	896,450

## STATEMENT No. 8

## STATEMENT OF DRY SALT HERRING PACKS, 1918-1927—BRITISH COLUMBIA

Year	District No. 1	District No. 2	District No. 3		Total
			East Coast	West Coast	
	cwt.	cwt.	cwt.	cwt.	cwt.
1918.....	20,000		109,900	42,710	172,610
1919.....	4,000		43,000	208,058	255,058
1920.....	807	1	176,640	334,720	512,168
1921.....	249		231,240	248,482	479,971
1922.....			297,871	224,897	522,768
1923.....		8,935	250,426	484,681	744,036
1924.....			305,266	548,277	853,543
1925.....		4,120	591,162	487,892	1,083,174
1926.....	11,134	4,192	596,114	327,207	938,647
1927.....	24,380	7,600	542,385	473,825	1,048,190

## FISHERIES BRANCH

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## STATEMENT No. 9

## PRODUCTION FISH OIL AND MEAL—BRITISH COLUMBIA, 1920-1927

Year	From Pilchards		From Herring		From Whales			From Other Sources	
	Meal and Fertilizer	Oil	Meal	Oil	Whale-bone and Meal	Fertilizer	Oil	Meal	Oil
	tons	gals.	tons	gals.	tons	tons	gals.	tons	gals.
1920.....					503	1,035	604,070	466	55,669
1921.....								489	44,700
1922.....					326	290	283,314	911	75,461
1923.....					485	910	706,514	823	180,318
1924.....					292	926	645,657	1,709	241,376
1925.....	2,083	495,653			347	835	556,939	2,468	354,853
1926.....	8,481	1,898,721	310	13,700	340	666	468,206	1,752	217,150
1927.....	12,169	2,673,876	1,838	170,450	345	651	437,967	2,512	375,130

## STATEMENT No. 10

## WHALE CATCH LANDINGS, BRITISH COLUMBIA, 1918 TO 1927

Species	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927
Sperm.....	All varieties	All varieties	All varieties	No Whaling plants operated 1921	38	94	83	76	80	82
Sulphur.....					4	62	56	29	14	10
Fin.....					94	166	125	135	124	138
Hump.....					50	78	47	40	25	21
Sei.....					1	53	100	68	25	7
Right.....							2		1	
Bottlenose.....						2	1	3		
Gray.....										
Totals.....	500	432	493	.....	187	455	414	351	260	258

## STATEMENT No. 11

## STATEMENT OF FUR SEAL SKINS TAKEN AND LANDED, BRITISH COLUMBIA, 1912-1927

Year	District No. 1	District No. 2	District No. 3	Total
1912.....			205	205
1913.....		285	119	404
1914.....		95	257	352
1915.....		39	400	439
1916.....		21	138	159
1917.....		14	204	218
1918.....		78	10	88
1919.....		53	17	70
1920.....		502	556	1,058
1921.....		270	2,079	2,349
1922.....		291	639	930
1923.....		678	3,746	4,424
1924.....		370	1,862	2,232
1925.....		810	3,655	4,465
1926.....		655	2,169	2,824
1927.....		188	1,288	1,476

## STATEMENT No. 13

## STATEMENT OF FISHERY LICENSES ISSUED, BRITISH COLUMBIA, SEASON 1927—WHOLE PROVINCE

Variety of License	Issued			Transfers			Operating			Remarks
	Whites	Indians	Japs	Total	Whites	Indians	Japs	Total	Total	
Salmon Cannery.....	75			75					75	
Salmon Curing.....	35		3	38					38	(1 cancelled)
Salmon Drag-seine.....	31	15		46					46	
Salmon Purse-seine.....	434	48		482	68	5		73	555	
Salmon Trap-net.....	7			7					7	
Salmon Gill-net.....	2,816	1,158	912	4,886	723	34		757	5,643	(6 cancelled)
Salmon Trolling.....	2,193	657	155	3,005	88	1		89	3,094	(1 cancelled)
Boat.....	163	13	87	263	2			2	265	
Buyers.....	52		17	69					69	
Asst. Salmon Gill-net.....	335	286	490	1,111	3	1		4	1,115	(1 cancelled)
Asst. Salmon Seine.....	1,000	1,156		2,156					2,156	
Capt. Sal. Seine.....	135	279		414	2			2	416	(3 cancelled)
Miscellaneous Cannery.....	10			10					10	
Cod Gill-net.....	31			31					31	
Cod Hook and Line.....	247	38	25	310					310	
Crab.....	128	18	2	148					148	
Grayfish Gill-net.....	13	3	31	47					47	
Grayfish Hook and Line.....	124	4	62	190					190	(1 cancelled)
Smelt Drag-seine.....	29		3	32					32	
Smelt Purse-seine.....	6			6					6	
Smelt Gill-net.....	20		11	31					31	
Groundfish.....	37		19	56					56	
Oclichan.....	27	2	1	30					30	
Perch Drag-seine.....	26	3		29					29	
Perch Gill-net.....	4	1	5	10					10	
Shrimp.....	11		19	30					30	
Reduction Works.....	27			27					27	
Abalone.....	1			1					1	
Rock Cod Seine.....	1			1					1	
Sand Lance.....	1			1					1	
Herring Curing.....	24		1	25					25	
Herring Purse-seine.....	83		3	86					86	
Herring Gill-net.....	22		7	29					29	
Capt. Herring Seine.....	57	16	5	78					78	(2 cancelled)
Totals.....	8,205	3,697	1,990	13,892	886	41		927	14,819	(15 cancelled)

Indian Permits..... 830 (6 cancelled).

Angling Permits..... 45

Note.—Herring licenses issued for fiscal year. Above figures up to Dec. 31, 1927.

# FISHERIES BRANCH

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## STATEMENT No. 14

STATEMENT OF NUMBERS OF DIFFERENT SPECIES OF SALMON AND METHOD OF CAPTURE, REPORTED BY OPERATORS OF SALMON PURSE-SEINES, DRAG-SEINES, AND TRAP NETS AND BY SALMON CANNING, CURING, AND COLD STORAGE ESTABLISHMENTS, OF GILL-NET AND TROLL CAUGHT FISH, BRITISH COLUMBIA, 1920-1927.

	Sockeye	Springs	Bluebacks	Steelheads	Cohoos	Pinks	Chums	Total
<b>1920</b>								
Troll.....		199,492	72,933	2,581	312,943			587,949
Gill-net.....	3,751,724	398,172	562	40,831	537,925	4,842,499	416,348	9,988,061
Purse-Seines.....	153,580	4,666	753	80	84,383	4,633,505	524,998	5,401,765
Drag-Seines.....	321,894	1,849	1		9,220	347,135	10,281	690,380
Trap-nets.....	54,074	37,578	35,829	931	68,318	381,006	29,528	607,264
Totals.....	4,281,072	641,757	110,078	44,423	1,012,789	10,204,145	981,155	17,275,419
<b>1921</b>								
Troll.....		104,743	81,962	58	248,290			435,053
Gill-net.....	1,803,941	267,355	16,047	37,659	743,882	3,238,196	373,758	6,540,838
Purse-Seines.....	74,578	7,730	230	20	53,224	370,891	830,193	1,336,856
Drag-Seines.....	175,793	11			8,654	124,344	85,577	394,379
Trap-Nets.....	46,016	26,926	176	874	77,658	100,618	2,301	254,569
Totals.....	2,160,328	406,765	98,415	38,611	1,131,708	3,834,039	1,291,829	8,961,695
<b>1922</b>								
Troll.....		99,621	103,883	27	235,499			439,030
Gill-net.....	3,361,516	235,493	3,397	26,412	687,780	5,124,904	673,921	10,113,423
Purse-Seines.....	250,238	2,948	1,220	25	206,094	5,445,975	2,498,036	8,404,536
Drag-Seines.....	310,946	9			16,850	139,561	5,159	472,525
Trap-Nets.....	36,534	35,157	517	1,204	137,345	5,300	3,130	219,187
Totals.....	3,950,234	373,228	109,017	27,668	1,283,568	10,715,740	3,180,246	19,648,701
<b>1923</b>								
Troll.....		42,037	115,850	5	188,341			346,233
Gill-net.....	4,004,378	273,813		41,305	530,198	4,098,494	858,433	9,806,621
Purse-Seines.....	248,003	2,175	3,342	16	223,599	3,484,315	4,000,504	7,961,954
Drag-Seines.....	183,594				9,294	150,071	5,977	349,936
Trap-Nets.....	37,961	24,965		1,650	176,207	184,126	42,604	467,513
Totals.....	4,473,936	342,990	119,192	42,976	1,127,639	7,917,006	4,907,518	18,931,257
<b>1924</b>								
Troll.....		59,265	73,086	90	151,376			283,817
Gill-Net.....	4,252,829	228,924		62,680	515,726	3,583,335	1,587,538	10,231,032
Purse-Seines.....	405,798	2,530		1,251	172,041	8,137,998	4,773,994	13,493,512
Drag-Seines.....	268,483	2,122			15,233	14,451	11,187	311,476
Trap-Nets.....	56,123	13,005		1,649	149,220	18,711	15,103	253,811
Totals.....	4,983,233	305,846	73,086	65,670	1,003,596	11,754,395	6,387,822	24,573,643
<b>1925</b>								
Troll.....		132,136	179,160	313	318,852			630,461
Gill-Net.....	4,307,852	498,032		31,571	874,972	5,531,290	1,307,519	10,641,236
Purse-Seines.....	452,766	6,851		1,618	426,220	3,706,668	5,255,623	9,849,740
Drag-Seines.....	165,023			1	6,804	16,369	8,172	196,369
Trap-Nets.....	63,875	29,529	620	874	142,488	379,331	53,440	670,166
Totals.....	4,989,516	666,548	179,789	34,377	1,769,336	7,633,658	6,714,754	21,987,978
<b>1926</b>								
Troll.....		135,246	328,076	859	397,094			861,275
Gill-Net.....	3,634,337	320,962	13	79,179	482,579	2,803,151	1,111,695	8,431,916
Purse-Seines.....	403,047	4,357	3,909	248	464,211	10,770,891	6,129,410	17,776,073
Drag-Seines.....	156,959	3,250			5,825	6,530	1,369	173,933
Trap-Nets.....	38,080	26,105	3,864	399	94,588	23,353	40,961	227,350
Totals.....	4,232,423	489,920	335,862	80,685	1,444,297	13,603,925	7,283,435	27,470,547
<b>1927</b>								
Troll.....		294,325	341,999	1,902	430,601	5,684	4,113	1,078,624
Gill-net.....	3,562,885	275,158		77,311	520,229	2,392,434	516,604	7,344,621
Purse-Seine.....	391,222	14,654	21,479	1,051	339,766	1,515,984	4,817,537	7,101,693
Drag-Seine.....	67,220	2		3	1,490	212	6	68,933
Trap-Nets.....	50,781	30,148	602	1,268	91,469	240,281	8,492	423,041
Totals.....	4,072,108	614,287	364,080	81,535	1,383,555	4,154,595	5,346,752	16,016,912

## APPENDIX No. 2

## REPORT ON THE WORK OF THE BIOLOGICAL BOARD FOR 1927

By J. J. COWIE, *Hon. Secretary-Treasurer*

The Board has charge of and controls the work at the scientific stations, which are located at St. Andrews, N.B., Halifax, N.S., Nanaimo, B.C., and Prince Rupert, B.C.

It meets once a year or oftener at such times and places as may be found necessary. A committee known as the Executive Committee supervises and carries out the undertakings involved in the policies formulated by the board. Sub-committees on the Atlantic and Pacific coasts have immediate supervision under the central executive of the activities of the board.

## BIOLOGICAL STATION AT ST. ANDREW'S, N.B.

The following is a list of the investigators at this station and the work on which they were engaged:—

- Mr. W. R. Sawyer, Queen's University: "Effect of ultra-violet radiation on eggs and larvæ of fishes."
- Dr. A. Willey, McGill University: "Copepoda of the St. Croix estuary,"
- Dr. C. C. Benson, University of Toronto: "Chemistry of fish muscle."
- Dr. A. H. Gee, Yale University: "Bacteria concerned in haddock spoiling."
- Mr. A. F. Chaisson, Harvard University: "Effect of extreme salinities on fishes."
- Dr. Jan Jansen, (University of Oslo, Norway), University of Chicago: "Nervous system of the Hagfish (Myxine)."
- Mr. C. R. K. Allen, Dalhousie University: "Examination of test blocks for marine borers,"
- Prof. H. Wasteneys, University of Toronto: "Biochemical problems."

The complete list of the scientific investigators and the periods spent by them at the station this season is as follows:—

- Mr. C. R. K. Allen, Dalhousie University; August 31 to September 16.
- Prof. B. P. Babkin, Dalhousie University; June 28 to August 27.
- Miss Helen I. Battle, University of Western Ontario; June 15 to September 2.
- Dr. C. C. Benson, University of Toronto; July 12 to August 6.
- Mr. N. J. Berrill, University of London (Eng.); June 13 to September 2.
- Miss Mabel A. Borden, Dalhousie University; May 21 to August 9.
- Mr. A. F. Chaisson, Harvard University; July 7 to September 12.
- Miss Viola M. Davidson, High School of Commerce, Toronto; June 26 to August 23.
- Dr. A. H. Gee, Yale University; July 14 to September 8.
- Mr. N. E. Gibbons, Queens University; June 23 to September 3.
- Prof. J. N. Gowanlock, Dalhousie University; May 21 to September 13.
- Prof. H. B. Hachey, University of New Brunswick; June 1st to September 10.
- Mr. W. S. Hall, University of Toronto; May 25 to September 10.
- Dr. Jan Jansen (University of Oslo, Norway), University of Chicago; August 25 to August 31.
- Prof. A. B. Klugh, Queen's University; June 3 to September 2.
- Miss Margaret E. MacKay, Dalhousie University; June 25 to August 26.
- Mr. H. S. Morton, Dalhousie University, June 25 to July 18.
- Miss E. C. Odell, Macdonald College, McGill University; June 8 to September 17.
- Miss J. R. Pantou, University of Toronto; June 3 to August 6.
- Mr. R. E. Paterson, Queen's University; June 22 to August 28.
- Miss C. E. Rice, Queen's University; June 30 to September 3.
- Mr. A. D. Ritchie, University of Manchester (Eng.); June 13 to September 22.
- Mr. W. R. Sawyer, Queen's University; July 2 to September 10.
- Dr. W. W. Simpson, University of Toronto; June 4 to August 13; August 30 to September 15.
- Miss C. M. Spence, Queen's University; June 30 to September 3.
- Mr. W. E. Taylor, Malvern Collegiate, Toronto; June 25 to August 28.
- Prof. H. Wasteneys, University of Toronto; July 21 to July 27.
- Prof. A. Willey, McGill University; July 16 to August 14.
- Miss N. E. Wright, University of Western Ontario; June 15 to August 24.

## GENERAL AND FIELD INVESTIGATIONS

The general investigations, as well as the special investigations mentioned in the previous report, were carried on during the summer, and the following additional field work was accomplished.

A survey was made of Maces bay, N.B., by Dr. Huntsman, in connection with a claim made by Fishery Overseer Conley that many small lobsters are to be found near Lepreau, which point is too far distant from the known spawning areas for their presence to be explained by immigration. It was found that in certain sheltered areas, as in Pocologan bay, the water was of sufficiently high temperature and of the right salinity to bring the lobster fry through, proving that these inlets are very important for lobster breeding.

The scallop beds at Letang harbour were investigated by Dr. Huntsman and Professor Gowanloch, of Dalhousie University. The scallops were found to be shedding their spawn and their fry were swimming about in the water on the 13th of August. This establishes an earlier spawning for the scallop of our waters than had previously been known.

An investigation was also made of the spawning period of the scallops on the Digby grounds, for which purpose scallops were obtained and shipped alive to the Biological Station. They were examined by Professor Gowanloch.

At the request of the Department of Marine and Fisheries, an investigation was carried on in Northumberland strait by Mr. H. E. Tanner and Mr. A. E. Murray to determine whether fishing for lobsters should be allowed to begin earlier than at present in the late lobster fishing district. An examination was made of the lobsters there during the first two weeks in August to determine their condition.

The Biological Board was asked to send a representative to accompany the Hudson Strait Expedition, with a view to investigating fisheries and hydrographic conditions in the strait. Mr. Fr. Johansen, of Ottawa, was appointed for this work and left with the expedition from Halifax on the *Larch* July 16. During the trip to the strait drift bottles were put out and hydrographic records taken. A good collection of data and material has been made, full reports of which will appear later.

In connection with the investigations of Maritime lakes for the purpose of increasing their productivity, a survey was made of the Chamcook lakes area during the month of July by Mr. K. Chipman, of the Geological Survey, and his assistants.

The *Edward E. Prince* continued fish tagging operations, collection of algae and eel grass, and other general work, spending the greater part of the time at Cape Breton.

## VISITORS

The number of visitors to the station increases year by year, and is indicative of the interest that is being taken by scientists and by the general public in the work of the station.

Mr. H. J. Thorkelsen, of the International Education Board of the Rockefeller Foundation of New York city, visited the station on July 5 in connection with oceanographic and aquicultural plans of the board. Funds provided by that board have enabled investigators from Great Britain to take up work at this station.

Sir Halford Mackinder, Chairman of the Imperial Economic Committee, accompanied by Mr. J. J. Cowie, Secretary-Treasurer of the Biological Board, visited the station on September 18.

Among other visitors were the following: Dr. H. B. Bigelow, of the Museum of Comparative Zoology, Harvard University, Chairman of the North American Committee on Fishery Investigations; Prof. E. K. Marshall, of Johns Hopkins

University; Prof. W. A. Smith, of the University of West Virginia; Prof. P. M. Bayne, of Acadia University; Prof. E. L. Mark, of Cambridge, Mass.; and Prof. W. A. Parks, of the University of Toronto.

#### EXPERIMENTAL STATION AT HALIFAX, N.S.

Dr. H. R. Chipman, Chemist, commenced investigations on the heat capacity of cod muscle, after the construction of the calorimeter and preliminary tests had been concluded. The determinations which he completed indicated the latent heat of the fish muscle and also the specific heat of both frozen and unfrozen cod muscle. Further experiments were continued on the rusting of fish in cold storage.

Mr. Ernest Hess, Bacteriologist, was absent on holidays and leave of absence from July 1 to September 19. On his return he began an investigation of the changes which take place in the ammonia and total nitrogen in haddock muscle when stored at low temperatures.

Mr. Robert Ross, Assistant for Technical Processes, completed the designing and construction of two fillet skinning machines, one for power and one for foot operation. He carried on work on the preparation of frozen fillets in an attractive form. He resigned from this position on September 17 in order to attend Dalhousie University, but continued with work on the canning of cod chowder during such time as he was free from classes.

Mr. H. E. Tanner, Educator, resigned from his position on August 31. During July he continued the development of the educational work and the museum and worked up the results of measurements of lobsters in the gulf of St. Lawrence during the spring months. During the period of August 5-18 he investigated, with the aid of Mr. A. E. Murray, the condition of the lobsters in Northumberland strait to establish a rational close season for that region.

Mr. D. leB. Cooper continued the investigation of the chemistry of wood smoke, paying particular attention to the formaldehyde and acetic acid produced under various conditions of smoke production. He developed an electric furnace and an air mixer suitable for these investigations. His employment terminated on September 30.

Mr. Seth Crowell continued his demonstration of improved methods of splitting fish for the dried fish trade. After July 12 he was assisted by Wm. Madden. The portion of the coast covered included,—

- (a) Port Dufferin to Canso;
- (b) Shelburne to Digby and the Nova Scotia shore of the Bay of Fundy;
- (c) Cape Breton Island;
- (d) Prince Edward Island;
- (e) Halifax to Port Dufferin.

Mr. D. A. MacFadyen (University of Toronto) was employed for period from July 6 to September 30. He studied the changes in expressability of the juices of fish muscle before and after freezing at various temperatures and under various conditions of storage.

Mr. C. B. Weld continued his investigations on the changes in the microscopic structure of fish muscle during freezing and storage. His employment terminated on September 30.

During the last quarter investigations had largely to be discontinued owing to preparations for and the giving of various courses of instruction.

Mr. Ernest Hess, Bacteriologist, prepared and gave lectures for the Course for Fishermen and the Course for Cannery Foremen. He prepared provisional plans for a demonstration canning plant. During the Course for Cannery Foremen he conducted an investigation on the exhausting of cans of lobster meat.

Dr. H. R. Chipman, Chemist, was also engaged in giving lectures to the various courses being offered at the station. The investigation of the heat content of fish muscle was continued. He supervised Mr. Mahen's work.

Mr. W. W. Stewart made analyses of various samples of dried fish, ascertaining their water contents. He was unable to devote any time to the station after February 27.

Mr. K. W. Mahen continued his investigation on glazing and began further work to determine the relation between thickness of fish, temperature of brine and rate of freezing.

A number of temporary additions to the staff were made in connection with the various courses. These with dates of employment and subject taught were:—

Prof. A. Stanley Walker—January 18-February 28—Natural Resources.

Mr. Roy Anderson—January 18-February 28—Preparation of Dried and Boneless Fish.

Captain H. M. O'Hara—January 18-February 28—Navigation.

Mr. R. F. Ross—March 16-29 (part time)—By-Products.

Mr. Edgar Baker was employed as laboratory assistant during the period of January 16 to March 31.

Regular planktonic and hydrographic work has been continued at the two stations near Halifax.

#### COURSES OF INSTRUCTION

Three courses were given at the Fisheries Experimental Station during the quarter.

(1) *Course for Fishermen*: January 18-February 28. Attended by nineteen young fishermen. The courses and instructors were:—

(a) Preparation of Dried and Boneless Fish—Mr. Roy Anderson.

(b) Preparation of Pickled Fish—Mr. Robert Gray.

(c) Motor Engines—Mr. Ed. F. Mitchell.

(d) Navigation—Capt. H. M. O'Hara.

(e) Science—Drs. A. G. Huntsman, A. H. Leim, H. R. Chipman, Mr. E. Hess, and Professor J. N. Gowanloch.

(f) Natural Resources—Professors A. S. Walker and W. V. Longley.

#### REPORT ON COURSE FOR FISHERMEN, 1928

A considerable demand had come to the station during the late months in 1927 for a course in the curing of fish by drying and pickling. In response to this an effort was made to offer a suitable course. An Advisory Sub-Committee on Education was formed and the conclusion reached that the duration of such a course must be at least six weeks in order to be of benefit.

This period entailed a considerable financial loss for prospective students. A solution was reached when the Minister of Marine and Fisheries and the Biological Board of Canada decided to offer twenty-five scholarships to bona fide fishermen of the Maritime Provinces, who were between the ages of seventeen and thirty-five and who had reached grade six in the public schools.

Following this decision the following advertisement appeared in nine Maritime newspapers and one Montreal newspaper:—

#### GRANTS FOR FISHERMEN

The Biological Board of Canada offers to assist twenty-five fishermen from the Maritime Provinces to attend the Short Course for Fishermen to be given at the Fisheries Experimental Station, Halifax, N.S., during a term of six weeks commencing on January 18. Each will be given on completion of this course the sum of forty-five dollars plus the amount of railway fare for a return

trip between Halifax and the railway station nearest his home. Only bona fide fishermen from 17 to 35 years of age, who have passed through grade six in the Nova Scotia schools or an equivalent grade will be able to obtain these grants. Preference will be given to the first applicants. All applications should be addressed to Dr. A. G. Huntsman, Director, Fisheries Experimental Station, Halifax, N.S.

Through the co-operation of the Post Office Department a similar notice was displayed in two hundred and twelve post offices along the coasts of the Maritime Provinces.

In addition to this assistance which was participated in by each man who completed the course, the Rural Conference of the Roman Catholic Church gave twenty-five dollars to each man attending from the Diocese of Antigonish, regardless of denomination.

#### STUDENTS ATTENDING COURSE

Thirty-seven applications for scholarships were received. Some of these had to be refused because of lack of qualifications and a number of other applications were withdrawn.

Twenty men came to Halifax to attend the course. They were met at the railway station if they desired it and were given the addresses of suitable boarding and lodging houses. Those attending the course and their home addresses were:—

Alexander Baccardax, Poirierville, N.S.	John M. Homans, Clam Harbour, N.S.
Ellis Beiswanger, Fisherman's Harbour, N.S.	Harold Keefe, Dover, N.S.
John C. Burke, Main-à-Dieu, N.S.	Joseph Manuel, Canso, N.S.
Joachim Daigle, Richibucto, N.B.	Joseph Eugène Martel, Boudreauville, N.S.
Ralph F. Darrach, Herring Cove, N.S.	Melvin Rafuse, Fourchu, N.S.
Robert Newton Day, Musquodoboit Har- bour, N.S.	Frank Sampson, Sampsonville, N.S.
Ellsworth M. Doty, Ashmore, N.S.	Alphonse T. Samson, Petit de Grat, N.S.
Harold Flaherty, Canso, N.S.	Everett R. Smith, Port Hood Island, N.S.
Otto R. Garrison, Indian Harbour, N.S.	Walter Joshua Tobey, Port Hood Island, N.S.
Edgar Hache, Shippegan, N.B.	Forrest Watson, Hall's Harbour, N.S.

#### DURATION OF COURSE

The course began at the Fisheries Experimental Station, King's Wharf, on Wednesday, January 18, 1928, and terminated on February 28, 1928.

#### ATTENDANCE

Attendance was kept at all the regular classes and was in nearly every case 100 per cent. One man, Ellis Beiswanger, had to return home shortly after the commencement of the course. He did not qualify for a scholarship on this account.

#### HOURS AND PLACE OF INSTRUCTION

Classes began at 9 a.m. each morning. Four fifty-minute classes constituted the morning session. There were ten-minute intermissions between periods. Three similar classes were held in the afternoon commencing at 2.15 p.m. and terminating at 5.20. There were no classes after 12.50 p.m. on Saturday, except on two occasions.

All the instruction was given in the station buildings except that in "Motor Engines" which for lack of space had to be given in a show room rented from Stairs, Son and Morrow, Limited.

## INSTRUCTORS AND COURSES OF INSTRUCTION

At a meeting of the Advisory Sub-Committee on Education, attended by Rev. Father J. J. Tomkins of Canso and Prof. J. W. Trueman of the Agricultural College, Truro, besides the members of the committee, a thorough discussion of the courses desired took place.

Based on this discussion the following courses were given:—

1. *Preparation of Dried and Boneless Fish.*

Instructor: Mr. Roy Anderson, Short Beach, N.S.

2. *Preparation of Pickled Fish.*

Instructor: Mr. Robert Gray, Senior Inspector of Pickled Fish, Halifax.

3. *Motor Engines.*

Instructor: Mr. Edward F. Mitchell, Fisheries Experimental Station.

4. *Navigation.*

Instructor: Capt. H. M. O'Hara, Nova Scotia Technical College, Halifax.

5. *Science.*

Instructors: Drs. A. G. Huntsman, A. H. Leim, and H. R. Chipman, Mr. E. Hess, all of the Fisheries Experimental Station; Prof. J. N. Gowanloch, Dalhousie University, Halifax.

6. *Natural Resources.*

Instructors: Prof. A. Stanley Walker, King's College, Halifax, and Prof. W. V. Longley, Agricultural College, Truro.

Of these instructors the station was indebted to Dalhousie University for the services of Professor Gowanloch, to the Department of Natural Resources of Nova Scotia for those of Professor Longley, and to the Department of Marine and Fisheries for those of Mr. Gray. The other instructors were either on the staff of the station or were secured temporarily.

Through the courtesy of Robin, Jones and Whitman, Limited, Mr. J. H. Zwicker of Lunenburg took two of the classes in Dried and Boneless Fish.

A syllabus of the courses, together with the total number of hours devoted to each, follows.

In the case of the courses in the Preparation of Dried and Boneless and Pickled fish the class was divided into two sections so that each instructor had double the number of hours shown.

*Preparation of Dried and Boneless Fish*

(Messrs. Anderson and Zwicker. 36 hours)

Practical instruction in heading, splitting, washing, salting and drying fish. Also in the preparation of boneless fish, drying and boxing of same. Four hours were devoted to slack salting of fish as demonstrated by Mr. Zwicker. Each man prepared one thirty pound box of boneless fish and a quantity of dried fish. Included a visit to a local plant handling dried fish.

*Preparation of Pickled Fish*

(Mr. Gray. 32 hours)

Practical instruction in ripping, scraping, washing, packing and salting herring; grading herring; gutting, selecting, dredging and packing herring by the Scotch process; repacking for market; testing barrels. Each man was required to prepare and pack a quantity of herring in each of the various ways taught. A visit was made to a local fish handling plant where defects in containers and pack were pointed out.

*Motor Engines*

(Mr. Mitchell. 32 hours)

Practical work in disassembling, assembling and repairing gasoline engines. Elementary mechanics. Properties of gasoline. Cooling. Uncrating engines. Two and four cycle engines. Carburetors. Elementary electricity. Batteries. Coils. Ignition systems. Timing. Reverse gears. Valves and grinding. Oiling systems. Crude oil engines.

*Navigation*

(Capt. O'Hara. 34 hours)

Lectures with demonstrations and practical chart work. Shaping courses and measuring distances. Charts. Effect of engine on compass. Magnetic compass. Magnetic poles. Latitude and longitude. Mercator's chart. Finding magnetic courses. Nautical astronomy. True chart. Meridian altitudes. Turning true courses into magnetic ones. The sextant. Fixing ship's position. Longitude and time.

*Science*

(45 hours)

Lectures and demonstrations wherever possible. Some experiments and microscopic examinations were carried out by the men themselves.

*(a) Physics and Chemistry. (Dr. Chipman. 15 hours).*

Water, rain water, sea water, steam and ice, Expansion and contraction of water on cooling. Liquids. Solutions. Suspensions. Filtering. Saturation and supersaturation. Hydrometers. Density and specific gravity. Heat. Temperature. Conduction, Convection, Radiation. Thermometers. Boiling. Distillation. Evaporation. Condensation. Gases. Combustion. Atmosphere. Respiration. Barometers. Oxygen. Hydrogen. Carbon monoxide and dioxide. Ammonia. Liquefaction of gases. Refrigeration. Osmosis and salting of fish.

*(b) Biology and Conditions in the Sea. 19 hours. Dr. Huntsman, 8 hours;*

Professor Gowanloch, 5 hours; Dr. Leim, 6 hours.

Most important fishes. Methods of fishing. Location of fish. Migrations. Life histories of cod, haddock, herring, mackerel and lobsters. Food, rates of growth, reproduction, habits, distribution. Seasons in the water. Effect of ice. Effect of tides. Drift bottles. Circulation of water. Effect of physical conditions on distribution of animals.

*(c) Bacteriology. (Mr. Hess. 5 hours).*

Spoilage of food. Size, forms, growth, reproduction, activities, requirements of bacteria. Aerobic and anaerobic bacteria. Spore formation. Spore resistance. Bacteria in sea water. Bacteria in fresh fish. Preservation of fish by chilling, freezing, pickling, drying, smoking, salting, canning.

*(d) Principles of Curing, Drying and Freezing Fish. (Dr. Huntsman. 5 hours).*

Principles involved in bleeding, throating, splitting, washing, whitenaping and salting fish. Spoilage. Effect of low temperatures. Slow and rapid freezing. Brine freezing.

*(e) Fish Oils. (Dr. Chipman. 1 hour).*

Cod liver oil. Methods of preparation.

*Natural Resources*

(Professors Walker and Longley. 36 hours.)

(a) *Professor Walker.* (27 hours.)

Outline of industrial history. Functions of guilds and town. Mediaeval towns and fairs. Peasants' revolt. Overseas trade. Geographical, commercial and economic side of renaissance. Industrial revolution. Rise of trade organizations. Trades unions and co-operation. Economics. Demand and value. Production. Division of labour. Localization of industry. Efficiency of labour. Organization of industry. Distribution. Profits and wages. International trade. Bills of exchange. Drafts.

(b) *Professor Longley.* (9 hours.)

Co-operation. Co-operative marketing, its history, weaknesses, agencies, and types. Market information.

Mr. Anderson assisted in this course by recounting his experiences in the management of a co-operative lobster factory.

## MISCELLANEOUS CLASSES

(5 hours)

(a) *English.* (Dr. Chipman. 2 hours.)

Practice in writing business letters and simple essays.

(b) *Addresses.* (2 hours.)

Mr. A. M. Smith, of A. M. Smith and Co., gave an address on the problems confronting the exporter of dried fish.

Mr. H. V. D. Laing, of the National Fish Company, addressed the students on the problems encountered by the wholesaler of fresh fish.

## DISCUSSIONS

(Dr. Huntsman. 1 hour.)

Answers to questions submitted by students. Many other questions were answered during the course of other lectures.

## INSTRUCTION IN CANNING AND SMOKING

A number of the men requested that they be given certain additional instruction in other methods of preserving fish. Two such groups were organized which took classes after hours or on Saturday afternoons. One group, taken by Dr. Huntsman, went into the principles involved in smoking and the other group, studied the principles of canning with Mr. Hess.

## EXAMINATIONS

On the closing day of the course written examinations of one hour's duration were held in each of the six major subjects of the course. These were taken by all of the men with the following results:—

*Passed with Honours:* F. Watson, E. Smith, F. Sampson, M. Rafuse, J. Daigle, J. Manuel.

*Passed:* H. Flaherty, O. R. Garrison, J. M. Homans, H. Keefe, E. Doty, E. Martell, A. Baccardax, J. C. Burke, W. Tobey, E. Hache, A. Samson.

*Failed:* R. Darrach, R. Day.

## EVENING LECTURES AND ENTERTAINMENTS

The offer made by Professor Gowanloch to organize a series of evening lectures for the men attending the course was gladly accepted. He arranged with eight other members of the staff of Dalhousie University and the following evening lectures were given:—

"Paris." Illustrated. Prof. Mercer.

"All flesh is Grass." Illustrated. Prof. H. P. Bell.

"How we talk." Prof. E. W. Nichols.

"Life in the Sea." Illustrated. Prof. J. N. Gowanloch.

"New Zealand." Illustrated. Prof. C. Bennett.

"Value of our Foods." Prof. G. Young.

"Unification of Italy." Prof. G. Wilson.

"The Nature of Electricity." Illustrated with experiments. Prof. J. Johnstone.

"Colours and Illusions." Illustrated by experiments. Prof. J. Symons.

A series of motion picture films which were loaned by the Motion Picture Bureau, Ottawa, which dealt with sport and commercial fishing on the Atlantic and Pacific coasts were shown to the men. Acknowledgment is due to the Halifax Y.M.C.A. for the use of a lecture room and projection apparatus for these pictures.

On invitation of the Biological Club, Dalhousie University, the men were able to hear an illustrated lecture by Mr. George Whitely of Saint Johns, Nfld. on fishing activities on the Labrador coast.

Attendance at these evening lectures was not compulsory but there was usually a good attendance and considerable interest was shown in the series. The co-operation of the lecturers is gratefully acknowledged.

On Saturday evening, February 25, a dinner was given to the class in the St. Julien room, Halifax Hotel, by the fish merchants along the water front of Halifax. Among others, Mr. Alex. Johnston, Deputy Minister of Marine and Fisheries, and Hon. J. A. Walker, Minister of Natural Resources, gave short addresses.

## ACKNOWLEDGMENTS

In a course of this nature so many persons assist in an advisory capacity that it is impossible to make mention of all who deserve credit.

Notice should be made of the following firms for the loan of equipment:—

National Fish Co.

A. M. Smith and Co.

Robin, Jones & Whitman, Ltd.

A. N. Whitman, Ltd.

(2) *Course for Hatchery Officers:* February 8-21.

Attended by Inspector of Hatcheries S. Walker and by Messrs. Burgess, Gates, Heatley, McCluskey, MacKenzie, Mowat, Ross and Tait, of the Maritime hatcheries. The courses of instruction and the instructors were:—

Physics and Chemistry—Dr. H. R. Chipman, 12 hours.

Anatomy and Physiology—Dr. A. H. Leim, 12 hours.

Fish Diseases—Dr. A. G. Huntsman, 12 hours.

Hatchery Practice—Dr. A. G. Huntsman, 12 hours.

Fish Foods—Dr. A. H. Leim, 12 hours.

Discussions—Drs. Huntsman & Leim, 18 hours.

(3) *Course for Lobster Cannery Foremen:* March 16-29.

Attended by fifteen foremen. The courses and instructors were:—

Physics and Chemistry—Dr. H. R. Chipman, 12 hours.

Biology—Drs. Huntsman and Leim, 6 hours.

Bacteriology—Mr. E. Hess, 9 hours.

Principles of Lobster Canning—Dr. A. G. Huntsman, 6 hours.

Methods of Lobster Canning—Mr. E. Hess, 5 hours.

Equipment—Mr. E. Hess, 6 hours.

Spoilage and Inspection—Mr. E. Hess, 3 hours.

By-Products—Mr. R. F. Ross, 3 hours.

Canning Lobster Paste—Mr. R. F. Ross, 3 hours.

Canning Practice—Mr. E. Hess, 19 hours.

Discussions.—Messrs. Huntsman, Hess and Leim, 7 hours.

## CO-OPERATION WITH DALHOUSIE UNIVERSITY

In the course last year Dalhousie University, Halifax, decided to establish a scientific course in fishery matters leading up to the degree of Bachelor of Science. An arrangement was afterwards entered into between the board and the university authorities by which the board's staff would co-operate in the instruction to be given. The university is to provide instruction in the courses, other than the practical ones. The practical instruction is to be given by the Biological Board's staff, who will be given, for that purpose, the status of regular members of the university staff.

The board, at the request of the department, also undertakes to supervise the erection of, and to maintain, a laboratory at the entrance to Halifax harbour for research and instruction in marine biology in connection with the university courses. The resources of the laboratory are to be available to students of any Canadian university, under such arrangements as may be made by the Biological Board and the various universities concerned. The laboratory is to be known as the Eastern Passage Marine Laboratory.

## FIELD WORK AND ADDRESSES

Dr. Leim visited a lobster retaining pond at Stonehurst, near Lunenburg, on January 11, at the request of the department. He made an examination of the salinity and temperature and arranged to have further samples collected to follow the conditions and if possible to estimate their effect on the impounded lobsters.

Dr. Huntsman visited Canso on March 27 where he addressed a meeting of fishermen dealing with the eggs and fry of fishes and the trawler question.

## DEMONSTRATION BUILDING

No particular progress was made with this plant until March, owing to other pressing matters. The small compressor was put into automatic operation and cold storage space became available. A salt water pump and pipe line was installed. The conveyor system on the brine tank was begun in March and largely completed.

Dr. Huntsman developed a means of cutting one-half pound cakes of fillets for freezing and a simpler improved form of skinner. Several hundred pounds of "Ice Fillets" as these cakes were called, were frozen and distributed in Montreal, Ottawa, and Toronto, in one pound cartons.

## PACIFIC BIOLOGICAL STATION, NANAIMO, B.C.

## RESEARCHES

*Systematic*

*Plankton Groups*.—Mr. G. H. Wailes has continued his detailed studies of protozoa, diatoms and copepods.

*Seaweeds*.—Rev. Robert Conell has prepared a list of the seaweeds occurring in the vicinity of the Station and Miss D. Newton has added some contributions.

*Annelids*.—Mrs. C. Berkley has continued her studies in this group.

*Prawns and Shrimps*.—Miss Alfreda Berkeley has worked out the species occurring on our Pacific coast.

*Parasitic Copepods*.—Miss Ruby Bere made an extensive collection of material in 1927 and worked over this as well as a great deal of material collected by various workers in recent years.

*Sponges*.—Mr. I. E. Cornwall has commenced a study of the sponges of our coast.

*Morphological*.—Mr. L. L. Bolton continued his detailed researches on the histological structure of the digestive tracts of fishes.

*Physiological and Biochemical*.—Dr. Blythe Eagles with the assistance of a grant from the Banting Foundation determined the distribution of glutathione and ergothioneine in the tissues of fish and many marine organisms.

Dr. F. D. White continued his study of the life-history of teredo and also undertook an investigation of the blood sugar of fish.

Dr. A. R. Fee made a special study of the secretion of urine in dogfish.

*Life-Histories and Ecology*.—Miss Alfreda Berkeley commenced a study of the life-histories of prawns and the economic phases of the prawn fishery of the coast.

Miss Gertrude Smith carried out a study of the ecological distribution of decapod crustacea in the vicinity of Sidney, B.C.

Dr. L. G. Saunders studied the life-histories and ecology of marine insects.

Mr. G. V. Wilby continued his investigation of ling cod, with special reference to the spawning.

*Oceanographical*.—The oceanographical studies in the strait of Georgia with special reference to the movements of the Fraser river water were continued.

Dr. A. H. Hutchinson dealt with the quantitative distribution of the phytoplankton and Miss Mildred Campbell with the zooplankton. Mr. C. C. Lucas dealt with the physico-chemical characteristics and Dr. W. A. Clemens handled the drift bottle work. Dr. H. C. Williamson has been making a study of oceanographical and plankton conditions throughout the year along the west coast of Vancouver island in connection with the studies of the pilchard and herring fisheries. The need for an extensive oceanographical program for the west coast has become very evident and if arrangements can be made for the use of a suitable boat the investigations will be commenced this summer.

The collection of oceanographical data is being made throughout the year at the wharf at the station, at a point in the strait of Georgia, in the strait of Juan de Fuca, near William Head through the courtesy of the Department of Public Health, and from two stations near Prince Rupert by the Fisheries Experimental Station. Daily temperature records of the Fraser river water are being obtained near New Westminster through the courtesy of the Fisheries Branch.

*Miscellaneous.*—Miss Dorothy Newton conducted some experiments with the cross fertilization of species of *fucus*.

Mr. C. Berkeley continued his studies of the luminescence of marine bacteria and commenced a study of annelid-algal symbiosis.

Dr. and Mrs. W. A. Clemens studied the collection of sockeye salmon scales of 1927 for the provincial Fisheries Department.

#### FIELD INVESTIGATIONS

##### *Propagation of Sockeye Salmon*

Dr. R. E. Foerster continued his studies at Cultus lake and is reporting in detail.

##### *Salmon Tagging*

The tagging of small coho salmon was carried out in the spring of 1927 in the strait of Georgia for the purpose of determining the locality to which these fish would eventually go to spawn and also to demonstrate to the fishermen that these small fish known as "bluebacks" would develop into cohoes and that they make a very rapid growth. This tagging was done by Mr. G. V. Wilby. The tagging of spring salmon was carried out on the west coast of Vancouver island off Quatsino and Kyuquot sounds from February to August. Mr. W. F. Baxter and Mr. C. McC. Mottley were engaged in this work. The object of this tagging was to determine if these more westerly fish had the same ultimate destination as those occurring off Barclay sound.

Mr. C. McC. Mottley made a special study of the scales of the spring salmon which were tagged, obtaining information as to their early history and determining their ages.

##### *Herring and Pilchards*

Dr. H. C. Williamson continued his studies of herring in the strait of Georgia and on the west coast of Vancouver island. In conjunction with this work, Mr. J. A. Munro, Chief Federal Migratory Bird Officer for the Western Provinces, spent four weeks at the station studying the relation of sea fowl to the spawning of herring. Special attention was given to gulls and to some extent to ducks.

Dr. Williamson has also been carrying out an extensive study of the pilchards of the west coast of Vancouver island. He has been giving special consideration to the relation of the physico-chemical factors and plankton occurrence to the movements and distribution of these fish. Mr. Mottley gave assistance for a short period in the field and Mr. G. H. Wailes has assisted with the qualitative and quantitative examination of the plankton collections and with the study of the stomach contents of both pilchards and herring.

##### *Clams*

Dr. C. McLean Fraser, with the assistance of Miss Gertrude Smith, continued the study of clams in the vicinity of Sidney, B.C. The results of the investigation have led to a modification of the clam fishing regulations.

##### *Oysters*

Mr. C. Roy Elsey gave continuous study throughout the summer to the propagation of the Japanese oyster in Ladysmith harbour. There has been doubt as to the ability of this oyster to spawn successfully, at least every year. Mr. Elsey kept the oysters under several artificial conditions and kept close observation of the oysters under natural conditions. Records of the physico-chemical conditions were kept in all cases. Spawning under natural conditions was very limited while under artificial conditions quite successful. It would appear that temperature was the most important factor. A shipment of spat was obtained from Japan for experimental work on later development.

### *Trout Propagation*

While no field work was carried out this year, various fish and game associations and fishery officers sent in specimens which have been examined by Prof. J. R. Dymond. As stated in last year's report, it seemed necessary as a preliminary to any trout cultural studies to determine the identity of the trout occurring in British Columbia. Prof. Dymond undertook the systematic study and asked that a young man be assigned to assist him during the winter of 1927 and in the field in 1928. In this way the assistant would become familiar with the systematic phases of the work and obtain the training necessary for the carrying out of the life history and propagation phases of the work. Mr. C. McC. Mottley was assigned to the investigation and spent six and one-half months at the University of Toronto.

Special study material have been supplied to:—

Professor Simon Gage, Cornell University, Lamprey larvæ and adults;

Dr. A. G. Revell, University of Alberta, fixed tissues of ling cod for histological study.

Visitors to the station during the year included Mr. J. J. Cowie, Mr. W. A. Found, and Mr. John Dybhavn.

Laboratory accommodations for short periods were given to:—

Dr. Bisby, College of Agriculture, Winnipeg, for the collection of fungi;

Dr. Parker D. Trask, Scripps Institution, for collection of bottom sediments;

Dr. J. H. Erwin, Saskatoon, collection of museum and study materials;

Dr. Paul Hiebert, University of Manitoba, survey of chemical problems.

### *Conference of Pacific Coast Investigators.*

During the last week in August a conference of the board's investigators on the Pacific coast was held at the Nanaimo station. Those in attendance were: Dr. Hutchinson, Dr. White, Mr. Wailes, Mr. Finn, Mr. Brocklesby, Mr. Smith, Dr. Foerster, Dr. Williamson, Dr. Clemens. Reports of the investigations being carried out by the workers were given and were followed by discussions.

### *Associate Committee on Oceanography, National Research Council.*

Following the meetings of the Pan-Pacific Science Congress in Japan, the National Research Council agreed to the formation of an Associate Committee on Oceanography which should establish connections with similar committees in other countries bordering the Pacific and attempt to bring about co-ordination and co-operation in the study of marine problems of the Pacific. A meeting was called by President Tory on January 7 in Edmonton and Dr. C. McLean Fraser was selected as the Chairman of the General Committee. Three sub-committees were decided upon namely:—

Physical and Chemical Oceanography—Dr. A. H. Hutchinson, Chairman.

Marine Biology—Dr. W. A. Clemens, Chairman.

Fish Technology—Mr. D. B. Finn, Chairman.

### PUBLICITY AND EDUCATION

An exhibit illustrating the results obtained from the tagging of spring salmon was prepared and placed in the Vancouver and New Westminster Fall Exhibitions. In both places the exhibit attracted a great deal of attention. Later the exhibit was placed in a store window in Nanaimo.

Eight newspaper articles dealing with the work of the Nanaimo Station were published by Mr. Norcross, Editor of the Vancouver *Star*. An article was also published by the Victoria *Colonist*.

During the year 846 persons visited the station museum. The average annual attendance for the past four years has been approximately 800 individuals.

Two small aquaria are being installed and these should serve to maintain interest in the marine forms. Mr. and Mrs. R. G. Good are preparing a number of fish casts for display.

Public lectures have been given in Nanaimo, Duncan and Vancouver.

#### PROPERTY DEVELOPMENT

During the year a coal and wood shed and garage was constructed to replace a very old structure which was about to collapse. A new salt water pump has been installed to provide a more adequate salt water supply to the laboratories and to provide fire protection. It is planned to later use salt water in the sanitary services in order to conserve the supply of fresh water. A new float was constructed at the end of the wharf and also a float to carry live-boxes for the purpose of keeping fish and other forms under experimental conditions. Four galvanized screen cages have been installed and other wooden cages will be made. Dr. Foerster has placed yearlings of three races of sockeye salmon in the cages in order to study the development of these races under identical environmental conditions.

### THE FISHERIES EXPERIMENTAL STATION AT PRINCE RUPERT, B.C., 1927-28

#### BUILDING

The building program for the last year has been confined to the completing of the interior of the building as described in the previous report. The library has been equipped with a full set of adjustable shelves. The laboratory has been further equipped with shelving, benches and cupboards. A store-room was built in the attic in which there has also been constructed a thermostatically controlled and properly ventilated animal room for metabolism work in connection with the vitamin assay work.

A gas machine has been installed in a small separate building which is also used to store combustible and explosive chemicals.

The installation of air compressing apparatus and hot-water boiler has been completed, and the electrical wiring extended so that the laboratories are now supplied with compressed air, gas, electricity, and hot and cold water.

#### LIBRARY

The library has been added to, mainly in the acquisition of the back numbers of technical journals and the most recent chemical publications concerning the work in hand.

#### LABORATORIES

Most of the standard equipment for the laboratory has been secured but apparatus still must be procured. Capital expenditure in this direction will be reduced during the coming year.

#### *Refrigeration.*

#### INVESTIGATION

In accordance with the plan as outlined in the previous report, Mr. I. M. Fraser of the Department of Mechanical Engineering of the University of Saskatchewan was appointed to complete the design of a model freezing plant. During the summer months Mr. Fraser completed plans and secured tenders on construction, but contracts were not let owing to there being no space available for its erection. No satisfactory arrangement could be made for the erection of the plant on the property of the Canadian Fish and Cold Storage Company. Thus the progress which was hoped for was not made. If this work is considered by the board to be worth while, immediate steps should be taken to secure the necessary accommodation for this demonstration plant.

Work is at present being undertaken upon the comparative effects of rapid and slow freezing on the chemical composition and food value of fish. A study of the changes which occur in the fats and oils of fish during storage. An examination of the nature of and condition responsible for the production of rusting.

During the coming year it is hoped that by the erection of properly controlled low temperature rooms, this work may be extended to an investigation of changes in both physical and chemical characteristics during prolonged storage, especially with regard to changes which occur in quickly frozen fish during storage.

It is also hoped that during the coming year proper provision will be made for the erection of a demonstration refrigeration plant.

### *Vitamin Research.*

#### OILS

The station has now a properly equipped animal room and is provided with the apparatus for the carrying on of its work in testing the vitamin potency of fish oils.

One paper, the Determination of Vitamin A Content in Liver Oil of the Dogfish, *Squalus Sucklii*, by H. N. Brocklesby, has been published in the "Canadian Chemistry and Metallurgy" September, 1927. Mr. Brocklesby is now engaged in a vitamin D assay of the same oil, which work is rapidly nearing completion.

Eventually it is hoped to extend this work to many other fish oils and to determine seasonal variation as well as the effect of various methods of processing upon the vitamin potency.

Work on the oil changes in fish during long storage has already been outlined under refrigeration.

### *Composition and Properties of Fish Oils*

An investigation into the chemical composition and behaviour of salmon oil has been started. The possibility of its use in paints and varnishes is being explored. Its behaviour to heat and oxidation and various other treatment has been studied, but it will be some time before this work is completed.

Samples of other oils, such as pilchard, oulachan, halibut, skate, and rat-fish oils have been procured, and it is hoped that these will be examined in a similar manner in the near future.

### *Fish Glues*

Fish glue is manufactured commercially only by secret process. Because of this a great deal of preliminary experimental work has been necessary to ascertain standard methods of preparation and testing of glues.

Five or six of the most recent and widely used methods of preparation found in the literature were adopted, and about twenty-five samples of glue were prepared by these methods from halibut and salmon waste, whole dogfish and skate.

A selection of these glues has been sent to the Forest Products Laboratories, Vancouver, where their strengths will be measured in glued wooden joints made up under working conditions. A report will be made on their comparative adhesive powers, and their commercial value and fitness for different kinds of wood-working.

At the same time investigations are being made on the viscosity, hygroscopicity, ash content and nature of ash, drying rate and gel point of these different samples. The correlation of this data with the results of the strength tests should furnish valuable information as to what properties are desirable in a liquid glue and what methods of preparation show most promise of yielding good quality glue.

## DISCOLORATION OF HALIBUT IN HOLDS OF VESSELS

Investigation of this problem was carried on throughout the summer months. Firstly observations were made as to the conditions of the holds in fishing vessels in which discolored fish were found. Secondly, attempts were made to reproduce conditions which produced discolored fish, and thirdly, an attempt was made to isolate certain factors which were responsible for the discoloration. Among these a bacteriological examination of the holds and of the surface of the halibut holds promise of much valuable information. This work is planned for the coming year.

## MUSEUM

During the past year the station undertook to place an exhibit in the Prince Rupert Fair. This exhibit attracted wide attention, and indicated that further efforts in this direction would be quite worth while.

## PRAIRIE LAKES INVESTIGATIONS

The following report deals with the scientific investigation of the lakes of the Prairie Provinces in the year 1927. This year marks the commencement of the systematic study of this region. The investigations were in the nature of a preliminary survey of a number of lakes with a view to gaining a general knowledge of the problems of fisheries and fish culture in the Prairie Provinces.

The party in the field was under the charge of Mr. A. Bajkov, who was ably assisted by Mr. Alan Mozley (as general assistant), Mrs. B. Sharman (as chemical assistant), and for a short time by Mr. F. Neave and Dr. H. Chat-away.

## SUMMARY OF WORK

1. *Alkaline Lakes of Saskatchewan*

There are a great many alkaline lakes in Saskatchewan and Alberta. These lakes form a homogeneous group, individual lakes differing only slightly from one another in the essential features of their flora and fauna. Many of these lakes are without commercial fish at the present time and it is very desirable to establish fisheries on these lakes, if possible, as there is an abundance of food. Moreover, fish from alkaline lakes are in general of superior quality.

A few of the most important of the alkaline lakes of Saskatchewan were selected for examination during the past year, namely: Little and Big Quill lakes, near Wadena, Sask., and the Manitou group near Yonker, Sask. These lakes were visited at all seasons, and a satisfactory beginning was made on their study.

It appears that whitefish (*Coregonus clupeaformis*) and ciscoes (*Leucichthys* sp.) will thrive in certain of these lakes. The dominant animals, namely: *Corixa* sp., *Hyaella knickerbockeri* and *Diaptomus sicilis*, are admirably suited as food for these fishes. It is quite possible that a commercial fishery will be established on the Quill lakes in a few years, as the whitefish and cisco appear to be doing well in these lakes.

2. *The Lake Winnipeg System*

Under this heading are included lake Winnipeg proper and its connected waters.

*Lake Winnipeg.*—Lake Winnipeg is the most important lake coming within the scope of this investigation. Any further study of the lakes of the Prairie Provinces must be based on a thorough knowledge of this lake. It is the fundamental type of this area.

During the past year a beginning has been made with this work. Examinations were made at all seasons at various parts of the lake. A great many plankton selections were secured (both quantitative and qualitative), which will be very valuable in the future. A fine collection of lake Winnipeg fish and fish stomachs was obtained. A certain amount of information was also secured regarding the associated animals, especially the mollusks, physical and chemical conditions were observed.

*Lakes Winnipegosis and Manitoba.*—Lakes Winnipegosis and Manitoba rank second in importance to lake Winnipeg. The detailed investigation of these lakes should therefore be postponed until a better knowledge of conditions in lake Winnipeg has been obtained. It will therefore be the best policy to make only short visits to these lakes for routine observations during the coming year.

In 1927 and 1928 several visits were made to these lakes at different seasons. The usual collections of plankton, fish, fish stomachs and associated animals, together with certain significant hydrological data were obtained.

*Marking Fry.*—As fry are being planted in lake Winnipegosis at the present time, A Mozley has proceeded thither for the purpose of marking a large number, prior to their introduction into the lake.

*Lake Dauphin.*—A short visit was made to lake Dauphin during the past summer and a certain amount of useful information obtained. It seems that this lake will be useful for comparison with some of the alkaline lakes. It is therefore proposed to pay another visit to this lake during the coming summer if the time is available.

*Eastern Tributaries of Lake Winnipeg.*—Examinations were made of the following eastern tributaries of lake Winnipeg: Winnipeg river, Whiteshell river, Berens river, Big Black river. These eastern tributaries are of a distinct type as they drain the forested regions of eastern Manitoba. The study of the sturgeon was commenced in this region.

*Other Lakes.*—Lake St. Martin, Clearwater, Clear and Long lakes in Manitoba, and Fishing lake in Saskatchewan, were examined. A detailed report on Clearwater lake is appended.

The headquarters for these investigations were at the University of Manitoba, Zoology Department. Since Prof. O'Donoghue's departure, temporary quarters have been obtained in his vacated office.

A beginning has been made in the establishment of a reference collection of the plants and animals collected in the course of the investigations. This will be very valuable in the future. A number of important and essential reference books have been purchased which will form a basis for a library.

A small sailing yawl with auxiliary motor has been purchased for use on lake Winnipeg during the coming season. A few essential instruments have also been purchased.

It has been deemed advisable to make a few alterations in this boat, the most important one being the construction of a weatherproof cabin in order that work may proceed with less interruption from external conditions. Minor expenses in connection with the vessel include painting and the purchase of a few essential instruments, etc.

#### FISH—CULTURAL INVESTIGATIONS

The investigation into the propagation, natural and artificial, of sockeye salmon at Cultus lake, British Columbia, has now been in progress for three years. The work is essentially a field study but owing to the extent of the investigation it has had to be, of necessity, firmly established.

The station, known as the Pacific Salmon Research Station, consists primarily of the following structures:—

(1) A five-room bungalow, of which one room has been thus far set aside as a laboratory. A small store-room is located in the basement. The house is situated on the lake-front, occupying two of the 25 by 60-foot lots rented annually from the Cultus Lake Park Board.

(2) A 5 by 5 mesh galvanized iron screen fence, approximately two hundred feet long and eight feet high, constructed for the purpose of trapping and counting the small sockeye during their seaward migration. The fence was constructed in 1925.

(3) A hatchery and bungalow below the lake, erected in 1925 with funds returned to the department by the board for this purpose.

(4) A subsidiary hatchery and residence at Smith Falls on the east side of Cultus lake, erected in 1926 by the department.

(5) A picket weir with traps constructed some years ago for capturing and counting adult sockeye, migrating to the lake. This structure may later have to be removed and arrangements may be made for trapping the adult fish at the screen fence.

The hatcheries are operated by the Fisheries Branch in accordance with instructions issued by the Research Committee on Fish-culture as the program of the investigation directs.

The program of the investigation has been previously outlined. By the nature of the work each year's studies are conveniently divided into two sections—the enumeration and study of returning parent fish in the fall, and the enumeration and study of the down-stream migrating young in the spring. These studies are supplemented by experimental work and the elucidation of other life-history problems.

The investigation has not yet covered an entire cycle period of four years and the data obtained cannot therefore be completely correlated. As far as it has progressed, however, the results are:—

#### *Natural Propagation*

*Fall of 1925.*—Adults passing to lake—1,540 males, 3,883 females. Calculating 4,500 eggs per female, the total deposition was 17,473,500.

*Spring 1926.*—Down-stream migrants resulting from 1925 spawning—Fry only—12,568, or 0.07 per cent.

*Spring of 1927.*—Down-stream migrants resulting from 1925 spawning.—Yearlings only, 183,272, or 1.05 per cent.

*Spring of 1928.*—Down-stream migrants resulting from 1925 spawning.—Two-year-old migrants, now being counted.

The product of the 1925 spawning will return in 1929 as adult fish.

*Fall of 1927.*—Adults passing to the lake—25,658 males, 55,569 females. Total number of eggs carried to spawning beds, 250,060,500.

In 1927 the program called for artificial propagation with planting of eyed eggs, but due to the fact that a big run was indicated it was decided to alter the program in 1927 and 28, reversing the methods to be used. By this means the extent of the big year run could be determined and the effect of a very heavy spawning ascertained.

*Spring of 1928.*—Down-stream migrants resulting from 1927 spawning—Fry only—Count now proceeding, 91,000 taken to date.

*Artificial Propagation With Distribution of Fry*

*Fall of 1926.*—Adults counted—3,122 males, 1,949 females. Total eggs contained in the run, 8,770,500.

Total loss in females found dead due to retention.....	1,174,500 or 13.4%
Total loss due to incomplete spawning.....	1,108,360 or 12.6%
Total loss occurring during development.....	570,500 or 6.5%
Total loss previous to distribution.....	32.5%

*Spring of 1927.*—No Sockeye fry migrated.

*Spring of 1928.*—Down-stream migrants from spawning of 1926. Yearlings only—Count now proceeding, 170,621 taken to date.

*Artificial Propagation With Planting of Eyed Eggs*

This method of propagation will be carried out this fall. The capacity of the hatchery being 6,000,000 eggs, the collection will be limited to that number. Provision is being made for the economical disposition of the excess fish, if any.

Reports on the studies of the 1925 and 1926 sockeye runs of parent fish and of the hatchery operations of 1926-27 are in the hands of the Editor. The first report on the study of the down-stream migration, that of 1927, is being submitted for publication.

In connection with the spring migrations a proportion of each migration are being marked in order to determine the numbers caught commercially, the number that return to Cultus lake and to trace their movements to other areas. During the test counting of 1926, which does not enter otherwise into the investigation proper, 101,200 migrants were marked by removal of both pelvic fins. They are expected to return this fall and arrangements will be made with canneries and with American authorities whereby the numbers caught commercially may be ascertained. During the counting of 1927, 91,600 migrants were marked by removal of both pelvic fins and the adipose. During the present counting, approximately 100,000 will be marked by removal of both pelvic fins and the posterior half of the dorsal.

## ECOLOGICAL STUDIES

Ecological conditions related to the investigation are being carried out, such as, character and abundance of food in the lake, physical and chemical conditions prevailing in the lake, enemies and parasites.

## EXPERIMENTAL WORK

Problems related to the fertilization and hatching, feeding, etc., of sockeye are being carried out at the hatchery as opportunity and time allow. Sockeye now retained for two years, are being reared to maturity in order to check their growth against scale readings.

## APPENDIX NO. 3

## NATURAL HISTORY REPORT

BY ANDREW HALKETT, *Naturalist*

The main subjects summarized in the report, and which are drawn upon from material contained in previous detailed reports, are these:—

Scallop investigations made in Mahone bay, N.S.

Exploratory work carried on in search of areas where scallops exist in paying quantities at coasts of the three Maritime Provinces.

Examination of oyster beds at Upper Caraquet bay, Gloucester county, and at Baie du Vin, Northumberland county, N.B.

## SCALLOP INVESTIGATIONS MADE IN MAHONE BAY

These investigations were made between the dates of 8th and 22nd June, and as was done in 1926 were engaged in from three separate starting points, viz.: Indian point, Ernst island, and Tancook.

The condition of the scallop beds in Mahone bay has been annually examined since the year 1919. At that time it had been alleged that the scallop was becoming depleted in that bay, which led to departmental measures being taken to conserve it. It was not then known that the spawning time of the scallop in Mahone bay is in September in which month it was then legal to fish for it.

That having been ascertained, a new regulation was enacted prohibiting the taking of scallops in September, and as since 1919 the examining of the condition of the beds has been intrusted to me, among other matters of importance pertaining to my observations, I kept a constant lookout for the reappearance of the coming up young scallops.

This watching went on for four years, before I was able to detect signs of their appearance. The signs were first noticed in 1923. This led me in 1924 to watch for further evidence, but as in that year I did not detect any marked difference from what I had seen in the previous year, I patiently refrained from reporting anything regarding the matter until I was absolutely sure of my premises.

In time I began to hear of fishermen coming across scallops in January or so no bigger than a ten cent piece attached by byssus to other objects. Of that, however, I had no knowledge at first hand.

In 1925 the visible signs of the appearance of the coming up of the young scallops was so obvious that the phenomenon was reported by me in the report of that year.

As soon as I began the observations in that year, which were made in the month of August, I discerned distinct signs of improvement.

At a place examined at the western part of the bay, starting from Indian point, and not many miles from the town of Mahone, all of two-thirds of the scallops were under 4 inches, the largest was  $3\frac{1}{2}$  inches, and the remainder ranged from  $5\frac{1}{4}$  to  $7\frac{1}{4}$  inches.

Cruises were also made in 1925 among the scallop beds off various islands and off Gull Edge, and although the proportion of smaller to larger scallops at

those places was less than that at the place just mentioned, nevertheless about one-third of the total number over all the places examined in conjunction were young coming up scallops, as the following figures reveal:—

	Four inches and under	Above four inches
Off Indian point.....	29	14 43
Among the islands, approached from Tancook.....	82	185 267
Off Gull Edge.....	4	27 31
	115	226 341

In the year 1926 the scallop beds were examined, from the three starting points already mentioned, between the dates June 24 and July 16, and a second time between August 16 and 26.

On both occasions at the western part of the bay as approached from Indian point the number of scallops of 4 inches and under was much in excess of those over 4 inches. On the first occasion there were 250 of the former and 45 of the latter, and on the second occasion 129 of the former and 58 of the latter. Taken together, the number of 4 inches and under was 379 and the number over 4 inches 103. This was unprecedented.

As approached from Tancook, July 8-12, there were 20 of 4 inches or under and 69 over 4 inches, and as approached from that place, August 25, there were 26 of 4 inches or under and 54 over 4 inches. Taken together, the number of 4 inches or under was 46 and the number over 4 inches 123.

As approached from Ernst island, July 15, there were 2 of 4 inches or under and 15 over 4 inches, and as approached from that place, August 20 and 21, there were 7 of 4 inches or under and 65 over 4 inches. Taken together, the number of 4 inches or under was 9 and the number over 4 inches 80.

Taken jointly, the following figures, according to the three starting points, show the proportions of smaller and larger scallops obtained in Mahone bay *in toto* for 1926:—

	Four inches and under	Over four inches
Indian point.....	379	103 482
Tancook.....	46	123 169
Ernest island.....	9	80 89
	434	306 740

The investigations for 1927 were made earlier in the season than were those of 1926. They were commenced on June 8 and finished on June 22, whereas in 1926 they were commenced on June 24 and finished on August 25. This is mentioned because the proportion of scallops of 4 inches and under at the western part of the bay in 1927 was much below what it was in 1926. But this might be explainable by the stage of growth of the scallops, surmising that at the earlier period a 4-inch mesh, which is the legal size, did not procure many of the smaller scallops of the time. Therefore, if such were the case, in order to the obtaining of them a 2-inch mesh might have been required.

By June 18, however, and at a point approached from Tancook, and which was considerably eastward from where the small ones had been found in such numbers in 1926, out of 77 scallops obtained 29 were 4 inches or under and 48 were over 4 inches, which compares favourably with what had been found in 1926 in waters further away eastward from the town of Mahone.

The following figures, according to the three starting points, show the proportions of smaller and larger scallops obtained in Mahone bay *in toto* for 1927:—

	Four inches or under	Over 4 inches
Indian point.....	42	145 187
Tancook.....	29	48 77
Ernest island.....	2	21 23
	73	214 287

The full complement of the shells was marked and delivered at the Experimental Station for Fisheries, Halifax, so that the ages of the scallops might be ascertained by a count of the rings.

The following supply the particulars of the scallop investigations of Mahone bay for 1927:—

## DATA OF DRAGS

Scallops

1. June 8. Between Goat and Meisner's island, some 3 miles off Mahone. Rake drawn 600 yards. Depth 7 fathoms.	10
2. June 8. Between Meisner's and Steven's islands. Rake drawn 400 yards. Depth 6 fathoms.	9
3. June 8. Off Steven's island. Rake drawn 300 yards. Depth 5 fathoms.	1
4. June 8. Off Steven's island. Rake drawn 300 yards. (Opposite way from 3.) Depth 5 fathoms.	4
5. June 9. Off Gull Edge. Rakes drawn 200 yards. Depth 5 fathoms.	0
6. June 9. Off Gull Edge. Rakes drawn 400 yards. Depth 5 fathoms. Sea-bed rocky with a few empty scallop shells.	3
7. June 9. Off Steven's island, Rakes drawn 600 yards. Sea-bed rocky and muddy with dead eel-grass and some empty scallop shells.	8
8. June 11. Between Spectacle and Steven's island. Rakes drawn 500 yards. Depth 8 fathoms. Sea-bed rocks and mud.	21
9. June 11. Off Gull Edge. Rakes drawn 300 yards. Depth 4 fathoms. Sea-bed rocks and mud.	7
10. June 11. Making toward Gull Edge more or less opposite way from 9. Rakes drawn 350 yards. Depth 7 fathoms. Sea-bed rocks and mud.	10
11. June 11. Off Indian point, adjacent to village. Rakes drawn 150 yards. Depth 4 fathoms. Sea-bed mud.	6
12. June 13. Off Goat and Steven's island. Rakes drawn 400 yards. Depth 5 fathoms. Sea-bed rocks and mud.	9
13. June 13. Between Bachmann's and Meisner's islands and Steven's and Goat islands. Rakes drawn 600 yards. Depth 5 fathoms. Sea-bed rocks and mud.	37
14. June 13. Off Goat island making toward Billy Andrew's island. Rakes drawn 900 yards. Depth 5 fathoms. Sea-bed mud.	21
15. June 14. Off Billy Andrew's island making toward Goat island. Rakes drawn 600 yards. Depth 5 fathoms. Sea-bed mud.	12
16. June 14. Off Goat island making toward Meisner's island. Rakes drawn 900 yards. Depth 7 fathoms. Sea-bed mud.	17
17. June 14. Off Meisner's island making toward Goat island, and reaching opposite side of that island from 16. Rakes drawn 500 yards. Depth 6 fathoms. Sea-bed mud.	12
18. June 18. About 1½ miles off Tancook and making back towards Tancook with the tide. Rakes drawn 400 yards. Depth 16 fathoms. Sea-bed gravel and stones.	1
19. June 18. About three-fourth mile off Jockleap and some 3 miles off Tancook. Rakes drawn 400 yards. Depth 13 fathoms. Sea-bed smooth with some rocks.	36
20. June 18. Repetition of previous raking (19) from much the same starting point. Rakes drawn 400 yards. Depth 13 fathoms. Sea-bed smooth and some stones.	40
21. June 22. Off Bella island. Rake drawn 200 yards. Depth 9 fathoms. Sea-bed rocky.	3
22. June 22. Between Bella and Ernst islands. Rake drawn 200 yards. Depth 8 fathoms. Sea-bed rock, sand and mud.	9
23. June 22. Among the islands: Ernst, Bella and Heisler's. Rake drawn 250 yards. Depth 9 fathoms. Sea-bed rock and sand.	6
24. June 22. Along the opposite side of Heisler's island. Rake drawn 400 yards. Depth 6 fathoms. Sea-bed rocky and sand.	2
25. June 22. Between Heislars and Ernst islands. Rake drawn 300 yards. Depth 9 fathoms. Sea-bed rock and sand.	3

TABULATION ON THE NUMBERS AND SIZES OF THE SCALLOPS OBTAINED IN THE RAKINGS

INCHES																										Totals
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
2									1					1												1
3															1				1							1
4																1			1							1
5																			2							1
6																			3							1
7																			3							1
8																			4							1
9																			2							1
10																			2							1
11																			3							1
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14																			4							1
15																			5							1
16																			7							1
17																			3							1
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22																			3							1
23																			5							1
24																			3							1
25																			4							1
Totals	10	9	1	4	0	3	8	21	7	10	6	9	37	21	12	17	12	1	36	40	3	9	6	2	3	287

Tabulation showing the proportions of male and female scallops according to numbers and sizes for 1927:—

Inches	Males	Females	Totals
2	1		1
2½		1	1
2½	1	2	3
2½		2	2
2½	1	2	3
3	1	1	2
3½	2	1	3
3½	4	2	6
3½	3	2	5
3½	2	4	6
3½	3	4	7
3½	9	2	11
3½	3	3	6
4	11	6	17
4½	4	10	14
4½	14	18	32
4½	17	12	29
4½	13	7	20
4½	9	10	19
4½	6	5	11
4½	3	2	5
5	1	5	6
5½	3	4	7
5½	2	2	4
5½	3	1	4
5½	2		2
5½	3	5	8
5½	5	4	9
5½	3	4	7
6		4	6
6½	3	2	5
6½	1	3	4
6½	1	8	9
6½	4	4	8
6½		1	1
6½		2	2
7	1		1
7½	1		1
	140	147	287

The above tabulation shows that the number of male scallops and the number of female are approximately equal, and this is in keeping with what in general has been found to be the case through the investigations of previous years in Mahone bay, or indeed in the investigations made elsewhere, so that the combined data reveal that the proportion of either sex virtually stands at fifty to fifty per cent.

Two of the scallops included in the tabulation were old and sagged. One of them, a female (6¼ inches) was not so far gone as to hinder the determination of its sex. The other (5½ inches) was judged at the time to be a female with a query mark, but has been placed with the females in the tabulation.

There is something to point out here. Only within a degree is the size of a scallop a criterion of senility, or in other words some scallops are full grown and about to die when of a smaller size than others are, and the above mentioned two present an instance of that.

Tabulation showing the proportion of scallops 4 inches and under to those of over 4 inches, according to the rakings:—

## INDIAN POINT—JUNE 8-17

Rakings	Four inches or under	Over four inches	Total
1.....	2	8	10
2.....	3	6	9
3.....		1	1
4.....	1	3	4
5.....			0
6.....		3	3
7.....		8	8
8.....		21	21
9.....	2	5	7
10.....	3	7	10
11.....		6	6
12.....	3	6	9
13.....	8	20	37
14.....	8	13	21
15.....	6	6	12
16.....	5	12	17
17.....	1	11	12
	42	145	187

## TANCOOK—JUNE 18

18.....		1	1
19.....	14	22	36
20.....	15	25	40
	29	48	77

## ERNST ISLAND—JUNE 22

21.....	1	2	3
22.....	1	8	9
23.....		6	6
24.....		2	2
25.....		3	3
	2	21	23

## RECAPITULATION

Indian Point.....	42	145	187
Tancook.....	29	48	77
Ernst Island.....	2	21	23
	73	214	287

List of the Fauna, in general, brought up by the rakes.

*Sponges*.—One attached to a stone, another attached to a horse-mussel, and another attached to a horse-mussel valve.

*Coelenterates*.—Hydroids attached to above mentioned horse-mussel valve; several sea-anemonies.

*Echinoderms*.—Of these sea-urchins were the most numerous, although they were not in such excessive numbers as to seriously derange a balance of the fauna in general. As a rule they occurred in the rakes from one to several,

seldom none, but there were a few places notably off Gull Edge and among the islands, such as Ernst and Bella islands, where they were more or less numerous.

The number of sand-dollars, and also of brittle-stars (Ophiurians) and star-fishes inclusive of five-rayed and many-rayed kinds was not great.

At one part of the bay sea-cucumbers constitute a pest, as was ascertained in the first place during previous seasons. This place is situated off the west coast of Tancook extending for at least about  $1\frac{1}{2}$  miles. There in the season past only one scallop,  $4\frac{1}{2}$  inches, was obtained in a raking of some 400 yards.

*Annelids*.—A few of different kinds, some housed in tubes.

*Crustaceans*.—A crab (*Hyas*), a hermit-crab, a prawn, a shrimp.

*Mollusks*.—Some 10 horse-mussels, a cockle valve, 2 chitons, a so-called conch (*Lunatia*), 3 slipper-shells (*Crepidula*) attached to scallops obtained between Bella and Ernst Islands.

*Tunicates*.—Two ascidians.

*Fishes*.—Two skates, two skate egg-capsules, a flat fish.

The above list is presented in order to show the sort of living organisms that occur in Mahone bay other than scallops, and also to convey an idea as to their respective quantities. It may seem that echinoderms (sea-urchins, sand-dollars, brittle-stars, star-fishes, sea-cucumbers) are the most plentiful, and that of these sea-urchins are the most numerous. In general, however, sea-urchins or other echinoderms at the present time are not in such numbers so as to seriously affect the scallops in Mahone bay. As already pointed out urchins were fairly numerous at one or two localities, and at a spot about one and a half miles off Tancook, where sea-cucumbers occur, only one scallop was obtained.

#### NOTES

It may be interesting to state that by examining the gonads of the smallest scallops obtained it was found that such, in proportion to the sizes of the scallops, were heavily charged with the sex elements.

There are really three distinct species of scallop occurring in our maritime waters. Besides our own commercial species, the giant scallop (*Pecten tenuicostatus*), the species (*P. irradians*), commercially used in the United States, to a degree overlaps the United States border and is occasionally found in Mahone bay. During the past season a few scallops, mostly very tiny, were found in that bay and noted as *P. irradians*. Whilst engaged in exploratory work, however, off Miminegash, P.E.I., in July, two specimens of a third species (*P. islandicus*) were brought up by the drag, and being of full size I was able to identify them. This European species named after Iceland, parallels the case of *P. irradians* in overlapping, but from an opposite direction, into our maritime waters. As perchance the third species (*P. islandicus*) may casually make its way even as far southward as Mahone bay, possibly some of the very small or very young scallop specimens, which from time to time have been come across in that bay, may have been referable to *Pecten islandicus* instead of to *P. irradians* for at such an early stage of growth there might have been little to definitely distinguish them.

#### EXPLORATORY WORK CARRIED ON IN SEARCH OF AREAS WHERE SCALLOPS EXIST IN PAYING QUANTITIES AT COASTS OF THE THREE MARITIME PROVINCES

In this work considerable parts of the inshore waters of the Maritime Provinces were explored, and in the search for scallop areas close attention was given to the nature of the sea-beds in order to study out reasons why scallops are plentiful in some localities, scanty in others, and in others again altogether absent.

The patrol-boat *Mildred McColl* was placed at disposal for the work, and the coasts explored were these:—

*Gulf of St. Lawrence.*—That part of the coast of Prince county, P.E.I., embraced between Alberton and North point.

*Strait of Northumberland.*—That part of the coast of Prince county, embraced between Nail Head and Cape Wolfe; those parts of the coasts of Kent county, N.B., embraced between Buctouche and Cote Ste. Anne and between Richibucto and Point Sapin; that part of the coast of Nova Scotia operated from Wallace as a starting point and embracing off: Oak island, McDonald's cove, and cape John; and that part of the coast of Pictou county, N.S., off Big island, Merigomish.

*East Coast of Nova Scotia facing the Atlantic.*—Chedabucto bay, Guysboro county, and off cape Hogan, cape Breton; Whitehead, and Country harbour and neighbouring waters, Guysboro county; and Port Dufferin, Halifax county.

As a result of the work I can confidently assert that there are places where fishermen need never go in hope of getting scallops, for at such places they will never find them.

There are two very opposite reasons why scallops do not exist in plenty at certain places in particular. Whilst they can exist and thrive in mud of a certain consistency they cannot among the great wastes of soft mud such as were come across in the explorations at some parts of the Strait of Northumberland where hardly any living organisms of any sort exist.

On the other hand they cannot thrive at places infested with great multitudes of sea-urchins, sand-dollars, or sea-cucumbers, and although such fishes as skates and flat-fishes, which are endowed with great freedom of locomotion, find in such compacted masses over which they can easily move about a congenial haunt, they also only add to the conditions that occasion the absence of scallops from places of the kind.

In the search for scallops then, two things in particular should be kept in mind, viz: the material nature of the sea-beds and the kinds and numbers of the living organisms that have established themselves upon the beds to the exclusion of the scallops.

The nature of the sea-beds where scallops occur are diverse and varied. The composition may be of rock, gravel, sand, or even mud of a certain consistency, and with those materials, either when single or combined, there may be growths of sea-weeds and empty mollusk shells.

The mere nature of the sea-beds, however, will not account for why the scallop lives and thrives at certain localities, whilst it is not to be found at others where the physical nature of the beds, that is in so far as the materials that compose them are concerned, is essentially the same. The problem goes deeper, but in passing it may be said, there need be no fear of any serious decline in their numbers in so far as nature is concerned where once the scallop has successfully established itself.

The influence of special environment, whether in relation to the composition of the sea-bed or the kinds and numbers of living organisms upon the bed, is a reason why scallops are sometimes to be found in plenty at a certain place, whilst at an adjoining place they may not exist at all or may be so few in numbers as to be purely negligible. There is evidence to show that, barring the depleted state which owing to injudicious and over fishing the scallop had been reduced to, Mahone Bay is an instance of a place where scallops have been living and thriving, standing apart from an adjoining place where it would seem such has not been the case.

In the year 1926 an examination was made at a spot about one mile beyond the boundary of the bay and about two miles off Big Duck island. The nature of the sea-bed was composed of smooth sand with minute pebbles, and over this two rakes were drawn some 300 yards. The work, irrespective of the nature of the bottom, was heavy and laborious and had to be desisted or risk the loss of the rakes.

The organic material brought up consisted of 186 sand-dollars, a number of sea-urchins, two sea-cucumbers, a number of dead bivalve mollusk shells but no dead scallop shells, kelp and a small quantity of another kind of seaweed, and one scallop 6 inches in length.

Nowhere within the bay itself are sand-dollars, or any other sort of echinoderms, to be found in such excessive numbers.

A second drag, of some 300 yards, was made with the two rakes towards the boundary of the bay, starting from within the line and apparently dragging over and beyond it, the rakes in that case being lifted after having recrossed the line.

This drag, being adjacent to, or partly at most just over the line, is of consequence in a consideration of how in general the fauna is locally distributed.

The nature of the sea-bed was rocky, and the organic material brought up consisted of two or three sand-dollars, some sea-urchins, a many-rayed star fish, a sea-cucumber, a few broken bivalve mollusk shells including one or two scallop shells, a chiton on a stone, kelp, and 45 scallops measuring from  $3\frac{1}{4}$  to  $5\frac{1}{4}$  inches in length.

The nature of the sea-bed of the Buétouche-Côte Ste. Anne investigation which was made under the work of exploring for scallops in 1927, was mostly sandy, but there were parts where it was rocky or stony. Yet the suitable material composition of the sea-bed was counteracted by multitudes of sea-urchins, sand-dollars and sea-cucumbers, among which flatfishes, skates, crabs, etc., were moving about, and no scallops in drags totalling 3,800 yards were obtained.

The material composing the sea-beds therefore, in such cases as given above, will not solely account for either the absence or presence of scallops, for much is attributable to the kinds of organisms, and their numbers, indigenous to the places where respectively they do or do not occur.

There are places at the maritime coasts where a very varied but well balanced fauna exists and thrives. The fine red-sand-stone formation of which Prince Edward Island is composed affords an admirable instance of a place of the kind. The coasts of Prince county, P.E.I., differ considerably, either in the material composition of its sea-beds or in the manner of distribution of the living organisms indigenous to those beds, from those of all the other coasts where explorations were made in 1927.

The sea-beds there, both in the gulf and strait, are strewn with great numbers of clean and well preserved shells of bivalve mollusks, among which there exists just such a fauna in which the scallop has its part, and which, in the two coasts as taken together, embraces such living forms as horse-mussels and other bivalve mollusks; univalve mollusks; hermit-crabs; sea-urchins, sand-dollars, and star-fishes, but more or less in moderate numbers; tunicates; annelids; sea-anemonies; and sponges. Of these any manifest harm occasioned to the scallops seemed to be, when the beds were examined, on the part of the sponges. These were all confined, however, to local spots in the gulf, and any harm the sponges seemed to cause was simply that sometimes, as massive growths on the shells, the scallops were heavily laden down with them.

Paralleling as much as possible what had been done on the Prince Edward Island side of the strait, explorations were made on the New Brunswick side,

but after extensive raking with far less success. Thus, out of some 11,625 yards drawn only 69 scallops were obtained, and many of those rakings yielded none, whilst it was only at points bordering towards where they had been found more or less plentiful when approached from Prince Edward Island, that there was any manifest increase in the numbers. This was in marked contrast to the findings on the Prince Edward Island side, where out of 3,775 yards 253 scallops were obtained. Light is thus thrown on the manner in which the scallops are distributed at the northern terminus of the strait of Northumberland, and as I apprehend the scallop resource in the two provinces, taken in toto, is one and the same, bearing this in view, the only way apparently that New Brunswick fishermen could profitably engage in scallop fishing would be by going out from their own coast for at least ten miles until they got to where the scallops exist in greater numbers as approached from Prince Edward Island.

The scallops of the gulf differed in certain physical respects from those of the strait. In general they presented a clearer and more attractive appearance, but although usually of good size, none were found exceeding 6 inches across. Off Alberton,  $3\frac{1}{4}$  miles SE., in one drag over 300 yards, two rakes being used, no less than 187 scallops were obtained.

In the Nova Scotian part of the Northumberland strait explorations were made starting from Wallace, Cumberland county, and off Big island, Merigomish, Pictou county. At both these places there were great wastes of the soft mud of which mention has already been made.

In the former investigation the boat cruised about points beyond the harbour until, in so far as could be gathered, abreast of shores of Pictou county. Great stretches of the sea-bed in this region were composed of the soft mud in which hardly any living organisms of any sort existed, save an occasional stray crab or star-fish, and even where the bed was composed of sand or rock the effect of those great wastes was maintained, so that the fauna, although sometimes varied as to kind, was generally scarce in numbers. The whole environment was unadapted as a habitat of the scallop, and out of drags covering some 9,925 yards only 25 scallops were found. Scallops therefore do not exist at this part of the coast in any considerable numbers, let alone that they are not there in paying quantities.

As to the investigation made off Big island, the next and final one of the strait, the bed of the sea there was little else than a great waste of soft mud similar to that referred to under the Wallace investigation, so soft indeed that the material simply passed through the mesh of the drag as through a sieve, and when brought to the surface was as a rule entirely empty. Of living things there were exceedingly few, and in so far as scallops were concerned, out of drags totalling some 4,355 yards not a single scallop was obtained.

The final explorations were engaged in at various inshore waters of the east coast of Nova Scotia facing the Atlantic.

A very extensive examination was made of Chedabucto bay, but only nine scallops in all were found. The sea-bed of this bay is of very varied composition. According to spots the material consisted of rocks, stones, gravel, sand, or mud. At spots there were growths of kelp or of sponges, and at spots again sunken or dead eel-grass, sea-weeds, or other materials were mixed in a great mass. Instead of the clean and well-preserved mollusk shells such as were found strewn upon the sea-beds at coasts of Prince county, P.E.I., there were worn or broken valves of mollusk shells often in more moderate numbers, and they included some valves of scallop shells. The faunal forms were as a rule multitudinous but distributed very irregularly, there being spots where no living thing of any kind was to be found.

The present condition therefore of Chedabucto bay with its numerous sea-urchins, mixed with which were sand-dollars, ophiurians, star-fishes, sea-cucumbers, sponges, hydroids, sea-anemonies, crabs, dead barnacles, mussels and other mollusks, tunicates, flat-fishes, etc., is little other than a heterogeneous wilderness altogether unadaptable as a habitat of the scallop, and that any scallops exist there at all is only by casual occurrence.

At Whitehead, Country harbour and adjacent localities, and Port Dufferin no scallops were obtained.

At Whitehead the sea-bed was composed of sand, stones, mud, and muck, with growths of sea-weeds, and there were valves of mollusk shells, including some valves of scallop shells. At one spot among the weeds there were multitudes of sea-urchins; two sand-dollars were brought up with the muck; otherwise besides two horse-mussels, a limpet, a tunicate, and an egg-capsule of a skate, practically no faunal forms were found.

At Country harbour, including Isaac's harbour, cape Mocodome, etc., the sea-bed was composed of rocks and mud. At a spot among the mud at Country harbour there were numerous star-fishes and a flat-fish; a few star-fishes, a sea-urchin, and *Spirorbis* attached to bits of sea-weed were found where the sea-bed was composed of soft mud at Isaac's harbour; there were lots of sea-urchins on a hard bottom at Cape Mocodome; otherwise the faunal forms were few or none at all. A few valves of mollusk shells, including one valve of a scallop shell, were found at cape Mocodome.

Off Port Dufferin the sea-bed was composed of rocks, gravel, and mud. Multitudes of sea-urchins were found at a locality where the sea-bed was composed of rock and gravel with sea-weeds; otherwise except some star-fishes and a horse-mussel no faunal forms were found.

It need not be conjectured from the preceding paragraphs that all the inshore waters of Guysboro and Halifax counties must necessarily be entirely destitute of scallops, and in measure it is already known that such is not the case. A complete exploration, however, would require to be made before it can definitely be known where the scallops exist and where in general they do not in those inshore waters, as the following evidence may tend to show.

At Ecum Secum, which is situated between those counties, an investigation was made in 1926 and 207 scallops were obtained. It is true that although the occurrence of scallops at that place fell short of what had been expected through representations, nevertheless in proportion to the size of the area, scallops both on the Halifax county side and on the Guysboro county side were found to be there. On the Halifax side in seven rakings there were 64 scallops and on the Guysboro side in six rakings 143 scallops. Moreover, judging by heaps of shells which were seen and which had been lying on the land since 1925, and from heaps of shells seen at wharves or lying in the water, it was apparent that considerable fishing had been engaged in. The indications, however, were that owing to the circumscribed size of the area extensive fishing could not be indefinitely engaged in, and the circumstance of having in thirteen rakings procured 207 scallops is simply mentioned as an instance of a locality where scallops exist in contradistinction to other localities at coasts of those two counties where it was found they do not exist.

A complete exploration therefore of the inshore waters of Halifax and Guysboro counties is as yet a desideratum in view of its being fully known where at that part of the coast of Nova Scotia facing the Atlantic the scallop areas are.

## DATA OF DRAGS

1927	Scallops
1. July 27. Rake drawn 275 yards, 2½ miles W. by N½ N. off Miminegash. Depths at start and finish, 9-10½ fathoms. Nature of sea-bed sand with dead scallop and other bivalve shells. Faunae, a few sand-dollars and a hermit crab. . . . .	1
2. July 27. Rake drawn 300 yards, 2½ miles W. by N, off Miminegash. Depths at start and finish 11½-11 fathoms. Nature of sea-bed sand with dead scallop and other bivalve shells. Faunae, star-fish, 2 tiny sea-urchins, a few sand-dollars, a horse-mussel. . . . .	28
3. July 28. Rake drawn 600 yards, 2½ miles W. off Miminegash. Depths at start and finish 11½-11½ fathoms. Nature of sea-bed sand with dead scallop shells and a stone. Faunae, a few sand-dollars, 2 horse-mussels, one attached to pebbles, 4 specimens of a bivalve mollusk ( <i>Cythaerea</i> ) . . . . .	58
4. July 28. Rake drawn 500 yards, 2½ miles W. off Miminegash. Depths at start and finish 11½-11½ fathoms. Nature of sea-bed sand with dead scallop shells and a stone. Faunae, sand-dollars and a specimen of <i>Cythaerea</i> . . . . .	25
5. July 28. Rake drawn 450 yards, 2 miles W½ S. off Miminegash. Depths at start and finish 8-10 fathoms. Nature of sea-bed sand, rocks and pebbles (red sand-stone)—a piece of kelp. Faunae, a hermit-crab and 6 horse-mussels. . . . .	8
6. July 28. Rake drawn 300 yards, 3 miles W. by N½ N. off Miminegash. Depths at start and finish, 12-11½ fathoms. Nature of sea-bed sand and rocks. Faunae, 6, 5-rayed and 2, 6-rayed star-fish, some horse-mussels. . . . .	39
7. July 29. Rake drawn 300 yards, 7½ miles N.W.¼ N. off Miminegash. Depths at start and finish 17-17 fathoms. Nature of sea-bed gravelly with numbers of old dead scallop shells. Faunae, 1, 5-rayed, 3, 6-rayed and 2 many-rayed star-fish (one of the 6-rayed with a gastropod in its mouth), a number of sea-urchins, a male <i>Pecten islandicus</i> . . . . .	47
8. July 29. Rake drawn 250 yards, 8½ miles N.W. off Miminegash. Depths at start and finish 17½-18 fathoms. Nature of sea-bed gravelly. Faunae, 6 and many-rayed star-fish, a male specimen of <i>Pecten islandicus</i> . . . . .	30
9. July 29. Rake drawn 500 yards, 9 miles N.W. off Miminegash. Depths at start and finish 20-20 fathoms. Nature of sea-bed mud. Faunae, sea-mouse, 2 sea-urchins, 2 ophiurians, 3 valves of <i>Cythaerea</i> . . . . .	0
10. July 29. Rake drawn 300 yards, 6½ miles W.N.W. off Miminegash. Depths at start and finish 17-14 fathoms. Nature of sea-bed sand with dead scallop and other bivalve shells. Faunae, 2 large many-rayed star-fish, a few sea-urchins, and some sand-dollars. . . . .	17
11. August 2. Rakes drawn 600 yards, 2 miles off land between Alberton and Cape Kildare. Depths at start and finish 13-14 fathoms. Nature of sea-bed sandy with a few dead bivalve shells ( <i>Macra</i> and <i>Cythaerea</i> ). Faunae, whelk egg-capsules attached to one of the scallops. Besides the Fundy rake the fisherman engaged used a Mahone rake. . . . .	3
12. August 2. Rakes drawn 500 yards, some 5 miles off Cape Kildare. Depths at start and finish 14-14 fathoms. Nature of sea-bed sandy with dead bivalve shells and a piece of kelp. Faunae, capsules of round whelk or so-called conch ( <i>Lunatia heros</i> ), and capsules of whelk on a dead valve or <i>Macra</i> , a number of sand dollars, and two 5-rayed star-fish. One of the scallops obtained was smashed and a broken piece of another valve seemed to belong to it. . . . .	15
13. August 3. Rakes drawn 600 yards, 5 miles S.E. off Alberton. Depths at start and finish 13-12½ fathoms. Nature of sea-bed sandy and shelly. Faunae, 2 sea-urchins, 2 sand-dollars, a few specimens of <i>Cythaerea</i> . 2 of the scallops obtained were weighed with sponges, hydroids were attached to another, a tunicate to another, and a sea-anemone to still another. . . . .	5
14. August 3. Rakes drawn 375 yards, 5½ miles S.E. off Alberton. Depth at start 13½ fathoms. Nature of sea-bed sandy. Faunae, tunicates attached to a piece of wood, 2 sea-urchins, a few specimens of <i>Cythaerea</i> , and sand-dollars, 2 of the scallops obtained were heavily laden with sponges. . . . .	9
15. August 3. Rakes drawn 450 yards, 6 miles S.E. off Alberton. Depth at start and finish 15-13½ fathoms. Nature of sea-bed hard sand with several dead bivalve shells. Faunae, a number of sea-urchins and sand dollars, a 5-rayed star-fish, a sponge with a living gastropod half buried in it, a very large sponge attached to one of the scallops obtained and whelk eggs-capsules on another, 2 specimens of <i>Cythaerea</i> . . . . .	7
16. August 3. Rakes drawn 400 yards, 6 miles E.S.E. off Alberton. Depths at start and finish 16½-15½ fathoms. Nature of sea-bed sandy with some dead bivalve shells. Faunae, a number of sea-urchins, 2 sand-dollars, an annelid. Two of the scallops were heavily laden with sponges, and a larval form presumably of the lump-fish was found between the valves of one of the scallops. . . . .	3

1927

Scallops

17. August 3. Rakes drawn 510 yards, 6 miles S.E.  $\frac{1}{4}$  E. off Alberton bell-buoy. Depths at start and finish 13-15 fathoms. Sea-bed with a number of dead bivalve shells, including part of an old valve of an oyster. Faunae, 2, 5-rayed, 1, 6-rayed and 1, many-rayed star-fish, 5 sea-urchins, 4 sand-dollars, egg capsules of roundwhelk (so-called conch), a hermit-crab with its shell encased in a sponge and one of the scallops obtained laden with a sponge. . . . . 5
18. August 4. Rakes drawn 600 yards, some 5 miles off cape Kildare and some 7 miles off Tignish. Depths at start and finish 13-16 fathoms. Nature of sea-bed sand and shells—a small stone. Faunae, 8, 5-rayed and 1 many-rayed star-fish, 2 sea-urchins, egg capsules and round whelk (*Lunatia*), and of common whelk (*Buccinum*) on a piece of an oyster valve, one of the scallops obtained ( $1\frac{1}{4}$  in.) was attached by byssus to the inside of a shell of *Cythaerea*, a specimen of spindle-shell (*Fusus decemcostatus*) . . . . . 9
19. August 4. Rakes drawn 500 yards,  $2\frac{1}{4}$  miles S.S.W. adjacent to where previous drag terminated. Depths at start and finish 14-14 fathoms. Nature of sea-bed sand and shells. Faunae, 9, 5-rayed star-fish, 1 sea-urchin, one or two sand-dollars, a specimen of a spindle shell. . . . . 1
20. August 4. Rakes drawn 400 yards, 5 miles E. by S. off Alberton. Depths at start and finish  $13\frac{1}{2}$ -13 fathoms. Nature of sea-bed sandy with shells. Faunae, 8 sand-dollars, a large 5-rayed star-fish, spindle-shell with sponge, hermit-crab, an annelid, a whelk. . . . . 9
21. August 4. Rakes drawn 700 yards, 4 miles E. by S. off Alberton. Depths at start and finish 13-12  $\frac{1}{2}$  fathoms. Nature of sea-bed sand and rock. Faunae, round whelk egg-capsules, 2 specimens of *Cythaerea*. . . . . 6
22. August 5. Rakes drawn 700 yards, 4 miles E. by S. off Alberton. Depths at start and finish  $12\frac{1}{2}$ -12 fathoms. Nature of sea-bed sandy with dead bivalve shells. Faunae, some sand-dollars and egg-capsules of round whelk. . . . . 6
23. August 5. Rakes drawn 800 yards.  $3\frac{1}{2}$  miles S.E. off Alberton. Depth at start and finish  $12\frac{1}{2}$ -11  $\frac{1}{2}$  fathoms. Nature of sea-bed rocky with many dead scallop and other bivalve shells, stones and a little mud. Faunae, a few sea-urchins, a sand-dollar, a spindle-shell, a specimen of *Cythaerea*, a hermit-crab, pieces of egg-capsules of round whelk. . . . . 30
24. August 5. Rakes drawn 300 yards,  $3\frac{1}{4}$  miles S.E. off Alberton. Depths at start and finish  $12\frac{1}{2}$ -11  $\frac{1}{2}$  fathoms. Nature of sea-bed rocks and sand with shells. Faunae, some sea-urchins and some sand-dollars, sponge. . . . . 187
25. August 8. Rake drawn 700 yards, 5 miles S.E.  $\frac{1}{2}$  E. off North Point. Depths at start and finish  $16\frac{1}{2}$ -14 fathoms. Nature of sea-bed sand and rock (a piece of kelp and a stone). Faunae, practically none. . . . . 0
26. August 8. Rake drawn 400 yards, 3 miles E.S.E. off North Point. Depths at start and finish 12-12 fathoms. Nature of sea-bed rock. Faunae, 1, 5-rayed star, 2 horse-mussels, small tunicates. . . . . 0
27. August 8. Rake drawn 425 yards, about  $4\frac{1}{2}$  miles N.N.W. off Nail Head. Depths at start and finish 17-17  $\frac{1}{2}$  fathoms. Nature of sea-bed sandy (2 scallop valves). Faunae, none. . . . . 0
28. August 8. Rake drawn 500 yards, about  $5\frac{1}{2}$  miles N. by W. off Miminegash. Depths at start and finish 14-16 fathoms. Nature of sea-bed sandy with numerous dead bivalve shells. Faunae, a basket-star, sponges, etc. . . . . 18
29. August 9. Rake drawn 700 yards,  $2\frac{1}{2}$  miles off cape Wolfe. Depth at start and finish 10-10 fathoms. Nature of sea-bed sandy, with dead scallop and other bivalve shells. Faunae, numbers of sand-dollars and a specimen of *Cythaerea*. . . . . 1
30. August 11. Rake drawn 450 yards, 3 miles W.N.W. off cape Wolfe. Depth at start and finish 10-5  $\frac{1}{2}$  fathoms. Nature of sea-bed rocky and sandy with great numbers of dead scallop and other bivalve shells, and a few stones. Faunae, some sand-dollars, a 5-rayed star-fish, a sponge, a hermit-crab. The scallop obtained was covered with sponge and annelid tubes. . . . . 1
31. August 11. Rake drawn 400 yards, 4 miles N.E.  $\frac{1}{2}$  N. off Buctouche Light. Depth at start and finish 5-4  $\frac{1}{2}$  fathoms. Nature of sea-bed rocky with great numbers of various sized stones which weighed down the dredge. Faunae, great numbers of sand-dollars, a 5-rayed star-fish, 4 crabs (*Cancer*), some sponges, a flat fish, 2 female skates, etc. . . . . 0
32. August 11. Rake drawn 400 yards,  $4\frac{1}{2}$  miles off Buctouche Light. Depth at start and finish 5-5  $\frac{1}{2}$  fathoms. Nature of sea-bed rocky with dead bivalve shells. Faunae, numerous sand-dollars, 2 crabs (*Cancer* and *Hyas*), a flat-fish, a female skate, an egg-capsule of a skate. . . . . 0

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33. August 12. Rake drawn 300 yards, about 3 miles S.E.  $\frac{1}{2}$  E. off Buctouche Beach Light. Depth at start and finish 4½-5 fathoms. Nature of sea-bed rocky and sandy, with dead bivalve shells (but none of them scallop shells) great numbers of stones. Faunae, numerous sand-dollars, 4 crabs (2 of them *Cancer*), 3 hermit-crabs, a male lobster 6½ inches (released), a horse-mussel, specimen of *Astarte*, sponges, 2 female skates, also a tiny *Cancer*, specimen of *Macra*. 0
34. August 12. Rake drawn 300 yards, 3½ miles S.E. by E. off Buctouche Beach Light. Depth at start and finish 5½-6 fathoms. Nature of sea-bed sandy with dead bivalve shells. Faunae, great numbers of sand-dollars, a crab, a round whelk. . . . . 0
35. August 12. Rake drawn 375 yards, 5 miles N.E.  $\frac{1}{2}$  N. off Buctouche Beach Light. Depth at start and finish 7-7 fathoms. Nature of sea-bed sandy, with dead bivalve shells. Faunae, numerous sand-dollars, a round whelk, a male skate, specimens of *Crepidula fornicata* attached to two dead scallop shells. . . . . 0
36. August 12. Rake drawn 500 yards, 6½ miles E.  $\frac{1}{2}$  N. off Buctouche Beach Light. Depth at start and finish 8-8 fathoms. Nature of sea-bed sandy, with a few dead scallop and other bivalve shells. Faunae, numerous sand-dollars, 2 crabs (*Cancer*) one of them tiny. . . . . 0
37. August 13. Rake drawn 450 yards, 6 miles S.E.  $\frac{3}{4}$  E. off Cote Ste Anne (Chockfish River) and 6½ miles from Buctouche Beach Light. Depth at start and finish 8-8½ fathoms. Nature of sea-bed sandy, with a number of dead bivalve shells including a worn scallop valve 2½ inches. Faunae, numerous sand-dollars, 2 flatfish, a male skate, a few sponges, an annelid in a sponge, some ophiurians. 0
38. August 13. Rake drawn 500 yards, 5 miles E. by S. off Cote Ste. Anne. Depth at start and finish 9-7 fathoms. Nature of sea-bed sandy with some dead bivalve shells and a large stone with sponge growth. Faunae, multitudes of sand-dollars, 3 male and 2 female skates and 2 egg-capsules of skates, a few crabs (*Cancer*). . . . . 0
39. August 13. Rake drawn 375 yards, 2½ miles E. by S. off Cote Ste. Anne and 8 miles from Buctouche Beach Light. Depth at start and finish 7-6 fathoms. Nature of sea-bed sandy. Faunae, great multitudes of sand-dollars. . . . . 0
40. August 17. Rake drawn 450 yards, 3½ miles E.N.E. off Richibucto bell-buoy. Depth at start and finish 10-10 fathoms. Nature of sea-bed sandy with a worn scallop shell. Faunae, sand-dollars, 2 specimens of *Cythaerea*. . . . . 0
41. August 17. Rake drawn 750 yards, 6½ miles off Richibucto bell-buoy. Depth at start and finish 10-10 fathoms. Nature of sea-bed sand with a few scallop valves and valves of other mollusks. Faunae, numbers of sand-dollars, a crab (*Cancer*), 4 five-rayed star-fishes, numbers of *Cythaerea*. . . . . 3
42. August 17. Rake drawn 600 yards, 8 miles S.  $\frac{1}{2}$  E. off Point Sapin. Depth at start and finish 10-12 fathoms. Nature of sea-bed, stones and sand with a number of broken scallop valves and a few valves of other mollusks. Faunae, 2 five-rayed star-fishes, a sand-dollar. . . . . 3
43. August 17. Rake drawn 600 yards, some 5 miles S.E. by S.  $\frac{1}{2}$  S. off Point Sapin. Depth at start and finish 12-11 fathoms. Nature of sea-bed sandy with empty shells of *Cythaerea*. Faunae, numerous five-rayed star-fishes, some sand-dollars, piece of egg-capsule of round whelk (*Lunatia heros*). . . . . 0
44. August 17. Rake drawn 600 yards, 9 miles N. by E.  $\frac{1}{2}$  E. off Richibucto bell-buoy. Depth at start and finish 7-9 fathoms. Nature of sea-bed stones and sand. Faunae, a flat-fish, a crab (*Cancer*), a five-rayed star-fish, a few sand-dollars, some bivalve mollusks (*Cythaerea*). . . . . 0
45. August 17. Rake drawn 900 yards, 1½ miles N.E. by N.  $\frac{1}{2}$  N. off Richibucto bell-buoy. Depth at start and finish 9-10 fathoms. Nature of sea-bed stones and sand. Faunae, a five-rayed star-fish, 2 sand-dollars. . . . . 0
46. August 19. Rake drawn 500 yards, 5½ miles E.N.E. off Richibucto bell-buoy. Depth at start and finish 11-12 fathoms. Nature of sea-bed sandy (an empty shell and a valve of *Cythaerea*—a stone). Faunae, a five-rayed star-fish, a sand-dollar. . . . . 5
47. August 19. Rake drawn 600 yards, 7½ miles E.N.E. off Richibucto bell-buoy. Depth at start and finish 12-13 fathoms. Nature of sea-bed sandy with a few stones. Faunae, 2 five-rayed star-fishes, a sea-urchin. . . . . 0
48. August 19. Rake drawn 475 yards, 6 miles E.N.E. off Richibucto bell-buoy. Depth at start and finish 13-12 fathoms. Nature of sea-bed sandy. Faunae, a flat-fish, a male crab (*Cancer*), a sand-dollar. . . . . 0
49. August 19. Rake drawn 500 yards, 4½ miles off Richibucto bell-buoy. Depth at start and finish 12-11 fathoms. Nature of sea-bed rocks and sand with empty scallop shells. Faunae, barnacles on a large stone, 2 male crabs (*Cancer*), several small fishes (presumably larval forms of the lump-fish) between the valves of living scallops. . . . . 8

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50. August 19. Rake drawn 500 yards, 5 miles E. off Richibucto bell-buoy. Depth at start and finish 12-11½ fathoms. Nature of sea-bed rocks and sand. Faunae, a few sand-dollars, several male crabs (*Cancer*), a female skate, 2 bivalve mollusks (*Cythaerea*) . . . . . 2
51. August 19. Rake drawn 550 yards, some 3 miles E½ N. off Richibucto Cape Light. Depth at start and finish 12-11 fathoms. Nature of sea-bed sandy. Faunae, hydroids . . . . . 0
52. August 19. Rake drawn 450 yards, 2 miles N.E. off Richibucto Cape Light. Depth at start and finish 8-11 fathoms. Nature of sea-bed stones and sand. Faunae, a mussel and part of a mussel (*Mytilus*), 2 sea-urchins, young sponges on a stone, an annelid, a few ophiurians . . . . . 0
53. August 20. Rake drawn 600 yards, 9 miles S.E. by S. off Point Sapin. Depth at start and finish 13-14 fathoms. Nature of sea-bed sandy with a scallop valve and a few valves of other mollusks. Faunae, numerous five-rayed star-fishes, a sand-dollar, 2 sea-anemonies on a dead bivalve shell . . . . . 1
54. August 20. Rake drawn 600 yards, some 10 miles S. by E½ E. off Point Sapin. Depth at start and finish 14-14½ fathoms. Nature of sea-bed sandy with numbers of scallop and other bivalve shells. Faunae, several five-rayed and many-rayed star-fishes, some sea-urchins and sand-dollars, gastropod with sponge, whelk egg-capsules, portion of an egg capsule of round whelk, a sea-anemone . . . . . 23
55. August 20. Rake drawn 550 yards, 11 miles S.S.E. off Point Sapin. Depth at start and finish 14-13½ fathoms. Nature of sea-bed sandy. Faunae, numerous five-rayed star-fishes, some sand-dollars, a whelk egg-capsule . . . . . 1
56. August 20. Rake drawn 500 yards, 9 miles S.E.½ S. off Point Sapin. Depth at start and finish 14-14 fathoms. Nature of sea-bed sandy with some shells of bivalve mollusks. Faunae, numerous five-rayed and many-rayed star-fishes, one or two sea-urchins, a crab (*Hyas*) . . . . . 20
57. August 22. Rake drawn 600 yards, 6 miles E½ S. off Cape Richibucto Light. Depth at start and finish 9-13 fathoms. Nature of sea-bed sandy. Faunae, numerous bivalve mollusks (*Macra*), hydroids . . . . . 0
58. August 22. Rake drawn 800 yards, 7 miles S.E.½ E. off cape Richibucto Light. Depth at start and finish 14-16 fathoms. Nature of sea-bed stony and sandy with broken scallop valves and broken valves of other mollusks. Faunae, a few sand-dollars, a horse-mussel, an annelid . . . . . 3
59. August 22. Rake drawn 500 yards, 5 miles S.E.½ E. off Richibucto Cape Light. Depth at start and finish 10-9½ fathoms. Nature of sea-bed sandy with bivalve mollusk shells. Faunae, numerous sand-dollars, a female crab (*Cancer*), a hydroid . . . . . 0
60. August 30. Rake drawn 550 yards, 6½ miles N.E.½ E. off Oak Island, vicinity of Wallace, N.S. Depth at start and finish 12-14 fathoms. Nature of sea-bed muddy. Faunae, a five-rayed star-fish . . . . . 0
61. August 30. Rake drawn 575 yards, 7 miles N.E.½ E. off Oak Island. Depth at start and finish 12½-12 fathoms. Nature of sea-bed muddy with kelp. Faunae, none . . . . . 0
62. August 30. Rake drawn 600 yards, 7 miles N.E. by E. off Oak Island. Depth at start and finish 13½-14 fathoms. Nature of sea-bed mud. Faunae, a five-rayed star-fish . . . . . 0
63. August 30. Rake drawn 600 yards, 7¼ miles N.E. by E½ E. off Oak Island. Depth at start and finish 14-14 fathoms. Nature of sea-bed mud with kelp (2 scallop valves 2 inches and 3 inches). Faunae, a female crab (*Cancer*) . . . . . 0
64. August 30. Rake drawn 650 yards, 7 miles N.E. off Oak Island. Depth at start and finish 12½-14 fathoms. Nature of sea-bed mud. Faunae, none . . . . . 0
65. August 30. Rake drawn 600 yards, 3½ miles N.E. by E. off Oak Island. Depth at start and finish 9-8½ fathoms. Nature of sea-bed sand and stones with kelp and a number of scallop valves. Faunae, a mussel (*Mytilus*) . . . . . 3
66. August 30. Rake drawn 400 yards, 3½ miles N.E. by E. off Oak Island (a repeated drag). Depth at start and finish 8½-7½ fathoms. Nature of sea-bed sand with kelp (2 broken scallop valves). Faunae, 5 horse-mussels (*Modiola*), a tiny sea-urchin, a few bi-valve mollusks (*Cythaerea*) 2 female crabs (*Cancer*) with eggs on the swimmerets, a specimen of *Crepidula fornicata* on one of the two scallops obtained . . . . . 2
67. August 31. Rake drawn 600 yards, 2 miles N.W. by N. off McDonald's Cove. Depth at start and finish 8-7 fathoms. Nature of sea-bed sand and rock with kelp and some dead scallop shells. Faunae, a skate, mussels (*Mytilus*), a sea-urchin, a sponge, annelid tubes on a scallop valve . . . . . 0

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68. August 31. Rake drawn 800 yards,  $2\frac{1}{2}$  miles N.N.E. off McDonald's Cove. Depth at start and finish 8-12 $\frac{1}{2}$  fathoms. Nature of sea-bed sand and stones with some scallop valves and 3 shells of *Cythaerea*. Faunae, mussel (*Mytilus*) on a scallop valve, 6 very large five-rayed star fishes, 9 sea-urchins one being very large, barnacles, on a mussel, an orphiurian. . . . . 2
69. August 31. Rake drawn 800 yards, 3 miles N.N.E. off McDonald's cove, Depth at start and finish 13-12 $\frac{1}{2}$  fathoms. Nature of sea-bed sand and some stones with some mollusk shell valves. Faunae, a male crab (*Cancer*), 11 five-rayed star fishes 8 being very large, quite a number of sea-urchins, a few mussels, *Anomia* on one of the scallops obtained, a small fish (presumably a larval form of the lump-fish) . . . . . 2
70. August 31. Rake drawn 600 yards,  $2\frac{1}{2}$  miles E.N.E. off Cape John. Depth at start and finish, 11 $\frac{1}{2}$ -10 fathoms. Nature of sea-bed rock, sand, and mud with shells of bivalve mollusks. Faunae, one or two sand-dollars, a five-rayed star fish, some mussels, a larval form presumably of lump-fish. . . . . 11
71. August 31. Rake drawn 575 yards, 2 miles N.E. of Cape John. Depth at start and finish 9-7 $\frac{1}{2}$  fathoms. Nature of sea-bed sand and stones with kelp and valves of scallops. Faunae, mussels, egg-capsule of skate, sponges. . . . . 0
72. September 1. Rake drawn 675 yards, 4 miles N. by W. off Oak Island. Depth at start and finish 10-10 fathoms. Nature of sea-bed mud. Faunae, none. . . . . 0
73. September 1. Rake drawn 575 yards, 4 miles N. by E. off Cape Cliff. Depth at start and finish, 9-9 $\frac{1}{2}$  fathoms. Nature of sea-bed sand and stones with kelp and some scallop valves. Faunae, 5 male crabs (*Cancer*), 2 mussels. . . . . 5
74. September 1. Rake drawn 650 yards, 2 miles N. by E. off Cape Cliff. Depth at start and finish 10-7 $\frac{1}{2}$  fathoms. Nature of sea-bed sand and stones with kelp and a few scallop valves. Faunae, a mussel, sponges on a large stone. . . . . 0
75. September 1. Rake drawn 675 yards,  $1\frac{1}{2}$  miles S.E.  $\frac{1}{2}$  S. off Oak Island. Depth at start and finish 8-7 fathoms. Nature of sea-bed mud and rocks with bits of kelp. Faunae, one or two sand-dollars, 3 mussels. . . . . 0
76. September 7. Rake drawn 775 yards, 3 miles N.N.E. off Big Island, Merigomish vicinity. Depth at start and finish 12-12 $\frac{1}{2}$  fathoms. Nature of sea-bed mud. Faunae, a five-rayed starfish or two. . . . . 0
77. September 7. Rake drawn 825 yards,  $2\frac{1}{2}$  miles N.E.  $\frac{1}{2}$  N. off Big Island. Depth at start and finish 14-14 fathoms. Nature of sea-bed mud. Faunae, none. . . . . 0
78. September 7. Rake drawn 875 yards, 2 miles N.E. by N.  $\frac{3}{4}$  N. off Big Island west. Depth at start and finish 12-10 fathoms. Nature of sea-bed mud. Faunae, 5 five-rayed starfishes. . . . . 0
79. September 7. Rake drawn 1,100 yards, 3 miles N.W. by N. west end off Big island. Depth at start and finish 10-9 fathoms. Nature of sea-bed mud with kelp. Faunae, a few hermit crabs, a female crab (*Cancer*), 7 five-rayed starfishes two of them tiny, sponges, 9 horse-mussels inside of one of which were a number of small living mussels. . . . . 0
80. September 10. Rake drawn 780 yards,  $5\frac{1}{2}$  miles N. off east end of Big island. Depth at start 14 fathoms. Nature of sea-bed mud. Faunae, none. . . . . 0
81. September 12. Rake drawn 700 yards,  $2\frac{1}{2}$  miles S. by W.  $\frac{1}{2}$  W. off Red Head (dead reckoning). Depth at start and finish 13-13 $\frac{1}{2}$  fathoms. Nature of sea-bed rocks with some kelp. Faunae, tunicates, bryozoans, eggs presumably of some mollusk, hydroids, annelid tubes, tiny crustaceans, dead barnacles, all on a large stone with algal growth. . . . . 0
82. September 12. Rake drawn 675 yards, about one mile S. off Argus buoy. Depth at start and finish 13-14 fathoms. Nature of sea-bed mud. Faunae, none. . . . . 0
83. September 12. Rake drawn 950 yards,  $\frac{1}{2}$  mile N. by E  $\frac{1}{2}$  E. off Argus buoy. Depth at start and finish 13-13 fathoms. Nature of sea-bed sand with scallop (2 fragments), and other mollusk (*Cythaerea*) valves—a stone. Faunae, 5 sea-urchins, a star-fish (purple with 9 rays). . . . . 0
84. September 12. Rake drawn 1,050 yards,  $1\frac{1}{2}$  miles S.S.E. off Ragged Head (dead reckoning). Depth at start and finish 8 $\frac{3}{4}$ -11 $\frac{1}{2}$  fathoms. Nature of sea-bed rocky (9 scallop valves). Faunae, a large five-rayed star-fish. . . . . 1
85. September 12. Rake drawn 600 yards,  $2\frac{3}{4}$  miles S.W.  $\frac{1}{2}$  W. off Ragged Head. Depth at start and finish 11-20 fathoms. Nature of sea-bed rocks with algae. Faunae, 2 five-rayed star-fishes. . . . . 0
86. September 13. Rake drawn 700 yards,  $\frac{1}{2}$  mile S.W. off Manhasset Beach. Depth at start and finish 19-17 fathoms. Nature of sea-bed mud (7 scallop valves, a valve of *Cythaerea*, and a stone). Faunae, whelk egg-capsules on the scallop obtained, hydroids on the stone, a tunicate. . . . . 1

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87. September 13. Rake drawn 800 yards,  $\frac{1}{2}$  mile S.E. off Stewart's Point. Depth at start and finish 16-12 fathoms. Nature of sea-bed sandy with some shells of bivalve mollusks. Faunae, numerous sea-urchins, 6 five-rayed star-fishes, 2 horse-mussels one of them on a stone, a hydroid. . . . . 1
88. September 13. Rake drawn 800 yards, close to Guysboro bell-buoy. Depth at start and finish 12-11 $\frac{1}{2}$  fathoms. Nature of sea-bed mud and stones. Faunae, a number of sea-urchins, 4 five-rayed star-fishes, 5 flatfish. . . . . 3
89. September 13. Rake drawn 850 yards,  $\frac{1}{2}$  mile E. off Rigsby head. Depth at start and finish 7-9 fathoms. Nature of sea-bed rocks (a valve of a mollusk). Faunae, 4 sea-urchins, a flatfish. . . . . 0
90. September 13. Rake drawn 700 yards,  $\frac{1}{2}$  mile S.E.  $\frac{1}{2}$  E. off Guysboro Light. Depth at start and finish 10-10 fathoms. Nature of sea-bed rock and kelp and mud at the finish (a few *Cythaerea* valves). Faunae, 4 five-rayed star-fishes, 3 sea-urchins, 2 flatfishes, a female skate. . . . . 0
91. September 14. Rake drawn 850 yards, some  $\frac{1}{2}$  mile N.W.  $\frac{1}{2}$  W. off Bond's Point (dead reckoning). Depth at start and finish 10-14 fathoms. Nature of sea-bed sand. Faunae, a five-rayed star-fish. . . . . 1
92. September 14. Rake drawn 100 yards,  $\frac{1}{2}$  mile N.W. off Bond's Point (rake had to be drawn up on account of nets and trawls). Depth at start and finish 15-17 fathoms. Nature of sea-bed mud. Faunae, none. . . . . 0
93. September 14. Rake drawn 450 yards,  $\frac{1}{2}$  mile N. off Halfway Cove. Depth at start and finish 18 $\frac{1}{2}$ -14 fathoms. Nature of sea-bed sandy with a few worn and broken scallop valves and valves of other mollusks. Faunae, none. . . . . 1
94. September 14. Rake drawn 1,200 yards,  $\frac{1}{2}$  mile W $\frac{1}{2}$  N. off Ragged Head at end of drag. Depth at start and finish 17-12 fathoms. Nature of sea-bed mud and sea-weed and sunken eel-grass (the sea-weed and other material in a great mass—a scallop valve). Faunae, several hermit-crabs, a female crab and a tiny crab (*Cancer*), numerous sea-urchins, 2 sea-eucumbers, several five-rayed star-fishes, an ophiurian, a horse-mussel, egg-capsule of skate, a flatfish. . . . . 0
95. September 14. Rake drawn 900 yards, one mile S. by E. off J. J. Callahan's property. Depth at start and finish 12-12 fathoms. Faunae, none save a valve of *Cythaerea*. . . . . 0
96. September 15. Rake drawn 675 yards, outside the bar in the vicinity of Guysboro. Depth at start and finish 9 $\frac{1}{2}$ -4 fathoms. Nature of sea-bed rocks with old scallop valves and valves of other mollusks. Faunae, multitudes of sea-urchins, some sand-dollars, a specimen of spindle shell (*Fusus decemcostatus*) a large *Cythaerea*. . . . . 0
97. September 15. Rake drawn 800 yards, at entrance to Guysboro harbour. Depth at start and finish 4-13 fathoms. Nature of sea-bed rocks and kelp. Faunae, a few sea-urchins, some sea-anemonies, a common mussel (*Mytilus*), a horse-mussel (*Modiola*), a flatfish. . . . . 0
98. September 15. Rake drawn 600 yards, in Guysboro Harbour. Depth at start and finish 8-12 fathoms. Faunae, numerous sea-urchins and sand-dollars, a five-rayed star-fish, 3 anemonies. . . . . 0
99. September 15. Rake drawn 625 yards, in Guysboro Harbour. Depth at start and finish 8-3 fathoms. Faunae, great masses of sponges, numbers of common mussels, anemonies on mussels and on stones, *Anomia*, sponges and a barnacle on one of them. . . . . 0
100. September 15. Rake drawn 550 yards, in Guysboro Harbour. Depth at start and finish 8-5 fathoms. Nature of sea-bed rocks and mud (a scallop valve). Faunae, numerous sand-dollars and sea-urchins, a specimen of *Cythaerea*, 2 horse-mussels. . . . . 0
101. September 21. Rake drawn 600 yards, 1 $\frac{1}{2}$  miles off Ryter's Point (fog). Depth at start and finish 20-19 fathoms. Nature of sea-bed mud. Faunae, a five-rayed star-fish, an ophiurian. . . . . 0
102. September 21. Rake drawn 675 yards, 1 $\frac{1}{2}$  miles S. off Ragged Head. Depth at start and finish 20-19 $\frac{1}{2}$  fathoms. Faunae, none, save a piece of an old worn scallop valve and a five-rayed star-fish seen when dropping out. . . . . 0
103. September 21. Rake drawn 800 yards, about 2 $\frac{1}{2}$  miles E. by S. off Ragged Head. Depth at start and finish 18-14 $\frac{1}{2}$  fathoms. Nature of sea-bed mud. Faunae, none. . . . . 0
104. September 21. Rake drawn 350 yards, 3 miles N. by E. off Queensport (thick fog). Depth at start and finish 17-21 fathoms. Nature of sea-bed mud. Faunae, none. . . . . 0
105. September 22. Rake drawn 750 yards, N $\frac{1}{2}$  W. off Bond's Point. Depth at start and finish 15-19 fathoms. Nature of sea-bed mud. Faunae, a specimen of *Cythaerea* with hydroid. . . . . 0

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106. September 22. Rake drawn 850, 9 $\frac{1}{2}$  miles S.S.W. off J. J. Callahan's Bluff. Depth at start and finish 17 $\frac{1}{2}$ -12 fathoms. Nature of sea-bed sand and gravel with bits of dead eel-grass and a shell of *Cythaerea*. Faunae, 5 five-rayed star-fishes, a specimen of *Astarte*, hydroids, a small crustacean, a larval form of a fish presumably of a lump-fish in the scallop obtained. . . . . 1
107. September 22. Rake drawn 800 yards, 2 $\frac{1}{2}$  miles N.E.  $\frac{1}{2}$  N. off Dort Cove. Depth at start and finish 12 $\frac{1}{2}$ -17 fathoms. Nature of sea-bed mud. Faunae, a hydroid, a bryozoan, eggs of some kind. . . . . 0
108. September 22. Rake drawn 750 yards,  $\frac{1}{4}$  mile SE. off Ragged head. Depth at start and finish 17-12 fathoms. Nature of sea-bed sand and mud (a small bit of kelp). Faunae, a five-rayed star-fish, a hydroid with eggs of some sort attached. . . . . 0
109. September 22. Rake drawn 900 yards, S. by W $\frac{1}{2}$  off Keyes Pond. Depth at start and finish 16-15 fathoms. Nature of sea-bed muddy. Faunae, one or two five-rayed star-fish, an ophiurian. . . . . 0
110. September 22. Rake drawn 850, 2 $\frac{1}{2}$  miles N. by E $\frac{1}{2}$  E. off Queensport Light. Depth at start and finish 14-27 fathoms. Nature of sea-bed stones. Faunae, an acidian, hydroids. . . . . 0
111. September 24. Rake drawn 800 yards, 2 $\frac{1}{2}$  miles N.E. by N. off Queensport. Depth at start and finish 12-23 $\frac{1}{2}$  fathoms. Nature of sea-bed stones (fragments of scallop valve, valve of *Cythaerea*). Faunae, none. . . . . 0
112. September 24. Rake drawn 875 yards, 2 $\frac{1}{2}$  miles N.E. by E. off Queensport Light. Depth at start and finish 14-24 $\frac{1}{2}$  fathoms. Nature of sea-bed stones (2 *Cythaerea* shells). Faunae, a basket-fish, a five-rayed star-fish, a specimen of *Cythaerea* full of eggs. . . . . 0
113. September 24. Rake drawn 775 yards, 2 $\frac{1}{2}$  miles S.S.W. off Cape Argus. Depth at start and finish 12-16 fathoms. Nature of sea-bed rocks. Faunae, coelenterate. . . . . 0
114. September 24. Rake drawn 600 yards, 2 $\frac{3}{4}$  miles S.S.W. off Cape Argus. Depth at start and finish 18-17 fathoms. Nature of sea-bed stones. Faunae, a basket-fish and fragment of same. . . . . 0
115. September 24. Rake drawn 875 yards, S. by E. off Cape Argus. Depth at start and finish 17-14 fathoms. Nature of sea-bed stones. Faunae, an acidian, hydroids and bryozoans on a stone, and on the same stone 2 or 3 tiny scallops about  $\frac{1}{4}$  of an inch in diameter—otherwise. . . . . 0
116. September 24. Rake drawn 900 yards,  $\frac{3}{4}$  mile S.W.  $\frac{1}{2}$  W. off Cape Argus. Depth at start and finish 13-20 fathoms. Nature of sea-bed rocks. Faunae, a star-fish with 9 rays. . . . . 0
117. September 26. Rake drawn 950 yards, 2 $\frac{1}{2}$  miles S $\frac{1}{2}$  W. off Cape Hogan Light, Cape Breton. Depth at start and finish 17-25 fathoms. Nature of sea-bed great quantities of kelp. Faunae, an annelid, a chiton. . . . . 0
118. September 26. Rake drawn 950 yards, 2 $\frac{1}{2}$  miles W. by S. off Cape Hogan, C.B. Depth at start and finish 22-20 fathoms. Nature of sea-bed stones and kelp. Faunae, a few chitons. . . . . 0
119. September 26. Rake drawn 870 yards, 4 miles W. off Cape Hogan. Depth at start and finish 16 $\frac{1}{2}$ -28 fathoms. Nature of sea-bed stones. Faunae, an anemone on a stone, 2 acidians to which hydroids, algae, etc., were attached. . . . . 0
120. September 27. Rake drawn 750 yards, at the head of Yankee harbour, Whitehead. Depth at start and finish 9-7 fathoms. Nature of sea-bed mud and sea-weeds. Faunae, practically none. . . . . 0
121. September 27. Rake drawn 1,100 yards, SSE. off Three Top Island, Whitehead. Depth at start and finish 6-17 fathoms. Nature of sea-bed sea-weeds (2 mussel valves). Faunae, multitudes of sea-urchins, a horse-mussel with a small one attached, a limpet. . . . . 0
122. September 27. Rake drawn 950 yards, north end of Price's Island, Whitehead. Depth at start and finish 13-11 fathoms. Nature of sea-bed muck (5 scallop valves one of them being *Pecten islandicus* and several valves of *Cythaerea*—a stone). Faunae, 2 sand-dollars. . . . . 0
123. September 27. Rake drawn 950 yards, off Fishermans Island west, Whitehead. Depth at start and finish 11-7 fathoms. Nature of sea-bed sand with kelp (4 scallop valves and a few stones). Faunae, a horse-mussel, a tunicate, egg-capsule of a skate. . . . . 0
124. September 27. Rake drawn 600 yards, south off White Island, Whitehead. Depth at start and finish 7-9 fathoms. Nature of sea-bed muddy. Faunae practically none. . . . . 0

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Scallops

125. September 29. Rake drawn 900 yards $\frac{3}{4}$ mile, S.E. $\frac{1}{2}$ S. off Mount Misery, Country Harbour. Depth at start and finish 8-8 fathoms. Nature of sea-bed mud. Faunae, numerous five-rayed star-fishes, a flatfish. . . . .	0
126. September 29. Rake drawn 975 yards, 1 mile S.W.S. off Isaac's Harbour Light. Depth at start and finish 11-9 $\frac{1}{2}$ fathoms. Nature of sea-bed soft mud. Faunae, 5 five-rayed star-fishes, a sea-urchin, <i>Spirorbis</i> on bits of sea-weed. . . . .	0
127. September 29. Rake drawn 750 yards, $\frac{1}{2}$ mile N.E. off Country Harbour Head. Depth at start and finish 10-13 fathoms. Faunae, a five-rayed star-fish. . . . .	0
128. September 30. Rake drawn 400 yards, 300 yards E. by S. off Bell-buoy, Isaac's Harbour. Depth at start and finish 12-8 fathoms. Nature of sea-bed rocks. Faunae, none . . . . .	0
129. September 30. Rake drawn 450 yards, 300 yards west off Black Ledge, entrance to Isaac's Harbour. Depth at start and finish 14-11 $\frac{1}{2}$ fathoms. Nature of sea-bed rocks with sea-weed. Faunae, several sea-urchins. . . . .	0
130. September 30. Rake drawn 1500 yards, $\frac{3}{4}$ mile west off Island Harbour Light. Depth at start and finish 10-13 $\frac{1}{2}$ fathoms. Nature of sea-bed rocks with sea-weeds. Faunae, a five-rayed star-fish. . . . .	0
131. September 30. Rake drawn 1,050 yards, $\frac{1}{2}$ mile NNE. off cape Mocodome. Depth at start and finish 7-11 fathoms. Nature of sea-bed hard bottom with sea-weeds (a scallop valve and valves of various other mollusks). Faunae, lots of sea-urchins, 2 five-rayed star-fishes one very large, a small crab, egg-capsule of skate. . . . .	0
132. October 3. Rake drawn 975 yards in Port Dufferin Harbour. Depth at start and finish 10-6 fathoms. Nature of sea-bed rock, mud, and sea-weeds. Faunae, several five-rayed star-fishes. . . . .	0
133. October 3. Rake drawn 750 yards, 300 yards S.E. off Sandy Island, Port Dufferin. Depth at start and finish 8-9 fathoms. Nature of sea-bed rock, gravel, and sea-weeds. Faunae, multitudes of sea-urchins, a five-rayed star-fish, a horse-mussel. . . . .	0
134. October 3. Rake drawn 750 yards, 1 $\frac{1}{4}$ miles N.E. off Beaver Light, Port Dufferin. Depth at start and finish 19-20 fathoms. Nature of sea-bed, hard-bottom (marked gravel on chart). Faunae, 6 five-rayed star-fishes. . . . .	0
135. October 3. Rake drawn 1,250 yards, $\frac{1}{4}$ mile N.E. by N. off Beaver Light. Depth at start and finish 16-11 fathoms. Nature of sea-bed mud. Faunae, none. . . . .	0
136. October 3. Rake drawn 800 yards, 400 yards S.E. off Hardwood, Port Dufferin. Depth at start and finish 12-9 fathoms. Nature of sea-bed mud and sea-weeds. Faunae, none. . . . .	0

The following concerns what was ascertained as to the spawning functions of the scallop.

Throughout the period of the observations in the gulf of St. Lawrence and northern part of the strait of Northumberland, which extended from July 27 until August 22, there were no indications of spawning. The gonads in all the scallops were full and expanded, and in colour those of the males were a beautiful cream and those of the females a vivid red, which was in keeping with what had been ascertained at all other localities where my observations hitherto were engaged in.

After then, between August 30 and October 3, only 34 scallops, all told, were obtained, 25 under the Wallace investigation and 9 in that of Chedabucto bay, the particulars of which are as follows:—

#### Wallace

August 30. A female obtained off Oak island was on the eve of spawning.

August 31. In the case of one male and two females obtained off McDonald's cove, and of 2 males and 8 females obtained off cape John, spawning was underway, and a scallop (sex indeterminable) obtained off cape John was practically spawned out.

September 1. Of 5 scallops obtained off cape Cliff, in one male and 3 females spawning was underway and in one male spawning was advanced.

Thus, in some wise, by that time of the year the function of spawning was manifested in the instances of 20 out of 25 scallops. Nevertheless, except in the scallop of which the sex could not be determined, the colours of the gonads were still maintained and were even in some cases bright.

There was an interval of time (during which the Big Island investigation was engaged in, at which place no scallops were found) between the Wallace and Chedabucto bay explorations, and the following particulars concern what was ascertained, through the 9 scallops obtained, relative to spawning at the latter place.

### *Chedabucto Bay*

September 12. Spawning in a male scallop was proceeding, but there were multitudes of sperms still in the gonad.

September 13. The gonad of a male was evidently caving in, but it still contained millions of sperms, and the creamy colour was still retained. In another male the milt was copious, and the gonad contained millions of sperms, the colour being still retained. The gonad of a female was getting spent, but it still contained numbers of eggs, and the red colour was retained. Another female had still numerous eggs in the gonad and the colour was retained. There was also another scallop (apparently obtained on the 13th) of which the sex was indeterminate as the gonad was spent of the sex elements and the colour was therefore faded out.

September 14. The gonad of a female was thinning out, but it still contained multitudes of eggs and the colour was vivid red. The gonad of another scallop, the sex of which could not be determined, was empty of the sex elements and the colour was faded out.

September 22. A scallop, possibly a female as there seemed to be the slightest tinge of red left was spawned out.

Such were the spawning conditions of the 9 scallops obtained at Chedabucto bay, between the dates of 12th and 22nd September, and I could tell by the conditions, that in general from then on the process would have been rapid, and have no doubt through my past experience that by the end of September spawning would practically have been over.

Mention is here made of two specimens of *Pecten islandicus* obtained a number of miles off Miminegash on July 29. This species of scallop occurs at coasts of Europe including Iceland (from whence it derives its name), and extends, but sparsely, into our Atlantic waters, and years ago I found it when dredging in the waters of the gulf of St. Lawrence. Both the specimens were males, and the condition of the gonad paralleled that of our own commercial scallop at that time of the year, being compact and full and of a similar creamy colour. The shells were handed over to Doctor Huntsman at the Experimental Station, Halifax.

The following tabulations of the measurements of scallop shells, which were prepared for Doctor Huntsman and delivered at the Experimental Station, Halifax, will illustrate the sizes and the proportion of males to females of the scallops, according to the respective sources from which they were obtained. The specimens queried mostly concern those of which the sex was indeterminate on account of the stage of development of the sex elements, so that the colours of the gonads, by which the sexes are distinguishable had faded out.

Besides those, however, a few were not determined for other reasons. The sex of a scallop attached by byssus to the inside of a shell of *Cythaerea*, owing to its small size ( $1\frac{1}{4}$  inches) was not determined, nor was that of another on account of the scallop being in bad condition, whilst in the case of a third the sex had not been ascertained for some unrecorded reason, as came to light on measuring the shell after the scallop itself had been disposed of.

## FISHERIES BRANCH

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## GULF—ABLERTON—NORTH PONT

Inches	Males	Females	?	Totals
11	1		1	2
21	2			2
21	1	1		2
21		1		1
21		1		1
21		1		1
21	2	2		4
31		2		2
31		2		2
31	1	2		3
31	2	2		4
31		3		3
31	3			3
41	2	3		5
41	5	3		8
41	3	1		4
41	1	2		3
41	2	2		4
41	2	1		3
41	2	2		4
41	7			7
51	1	5		6
51	1	1		2
51	4	3		7
51	4	2		6
51	2	1		3
51	4			4
51		1		1
51	1			1
61		1		1
	53	44	1	98

## STRAIT.—PRINCE COUNTY, P.E.I.—KENT COUNTY, N.B.

Inches	Males	Females	?	Totals
21	1			1
21	1			1
21	1			1
31	1	4		5
31		4		4
31	7	1		8
31	7	4		11
31	11	9		20
31	1	4		5
31	6	3		9
31	2			2
41	3	4		7
41	5	2	1	8
41	7	3		10
41	5	4		9
41	7	10		17
41	2	5		7
41	5	5		10
41	4	4		8
51	8	3		11
51		2	1	3
51	4	2		6
51	2	1		3
51		2		2
51	1			1
51		1		1
	91	77	2	170

## WALLACE

Inches	Males	Females	?	Totals
3.....	1	1		2
3 $\frac{1}{2}$ .....		2		2
3 $\frac{3}{4}$ .....		1		1
3 $\frac{1}{2}$ .....		1		1
3 $\frac{3}{4}$ .....	1	3		4
3 $\frac{1}{2}$ .....	1			1
4.....			1	1
4 $\frac{1}{2}$ .....		1		1
4 $\frac{1}{2}$ .....	1			1
4 $\frac{1}{2}$ .....	2	3		5
4 $\frac{1}{2}$ .....	2			2
4 $\frac{1}{2}$ .....	1	1		2
4 $\frac{1}{2}$ .....		1		1
4 $\frac{1}{2}$ .....	1			1
	10	14	1	25

## CHEDABUCTO BAY

3 $\frac{3}{4}$ .....		1		1
3 $\frac{1}{2}$ .....	1		2	3
4 $\frac{1}{2}$ .....	1			1
4 $\frac{1}{2}$ .....		1		1
5 $\frac{1}{2}$ .....	1			1
5 $\frac{1}{2}$ .....			1	1
5 $\frac{3}{4}$ .....		1		1
	3	3	3	9

## EXAMINATION OF OYSTER BEDS

Neither at Upper Caraquet bay nor at Baie du Vin, where the examinations were made, were the beds found to be in good shape.

In the former the oysters exist at the western end of the bay in an area of about one and a quarter miles by one mile, and are more numerous on the Maisonette side than they are on the Upper Caraquet side. The bay is supplied with fresh water by two rivers, known as the north and south rivers, and the south river is a more considerable body of water than the north river.

Great masses of debris, composed of dead oyster and dead mussel shells, sometimes mingled with dead eel-grass and mud, were brought up by the rakes, and the hand had often to be passed through that material in order to find the living oysters.

This spot of the Baie Chaleur, however, has according to its size doubtless been in the past a good oyster resort with a good quality oyster.

The oysters are now of small size, the great majority of those obtained were under three inches in length, and it may be that the oysters of this place have never been of any considerable size.

The following tabulation of the measurements of 103 oysters obtained in Upper Caraquet bay presents a comparison of the numbers of those under 3 inches with those of 3 inches and over.

Inches	Oysters	Inches	Oysters
1 1/2	1	3	6
1 1/4	2	3 1/4	2
1 1/2	1	3 1/2	6
1 1/4	4	3 3/4	4
2	4	3 1/2	3
2 1/4	6	3 3/4	3
2 1/2	11	3 1/2	1
2 3/4	7	4	1
2 1/2	11	4 1/4	1
2 3/4	7	4 1/2	2
2 1/2	9	5 1/4	2
2 3/4	8	5 1/2	1
Under 3 inches	71	3 inches and over	32

As regards the physical nature of the sea-bed, or what by nature pertained to it, there is the following to be stated:—

The bed was almost entirely composed of a mixture of sand and mud, with hardly such a thing as a stone, and there was an unlimited supply of food, as diatoms of various kinds were found in sediment from oyster and mussel shells, in the water in the pail, and in the digestive gland of the oyster.

Besides dead oyster and dead mussel shells, in spots there were living mussels that outnumbered the living oysters, to the detriment of the latter. Sometimes the oysters were rather laden with mussels, and on one of the larger oysters nine good-sized mussels were attached. But there were few attachments of other living objects on the oysters. A few specimens, alive or dead, of slipper shells (*Crepidula*) of the two species indigenous to Maritime waters were found.

Towards the north side of the bay numerous medusoids (jelly-fishes) were floating through the water, but unless such might be harmful to the floating oyster spat they could not be injurious to the oyster; and in general free moving forms on the sea-bed were so scarce as to be hardly worthy of mention, and no star-fishes were found.

The examination of the Upper Caraquet bay oyster bed was made on and between the dates of July 6 and 12. The spawning time was not then on, but it seemed apparent it was about to be.

The examination of oyster beds of Baie du Vin was made on the 9th of November.

The purpose of the visit was chiefly to examine the sizes of the oysters, which on certain beds were said to be very small. Those reputed beds were three in number, viz: Oyster point, Egg island, and Blue Rock beds. The distances between them were estimated approximately to be 1 1/2 miles between the first mentioned and the second, 2 miles between the second and third, and 3 1/2 miles between the first and third.

The examination of specimens was made when out with the local overseer in his boat, his guardian being also on board, when a sufficient number were obtained for the purpose required, besides which, the oyster fishing season being then open, specimens were also examined when among the fishing boats which were crowded in their operations on or bordering the Blue Rock bed, which was one of the beds where the oysters were alleged to be so small.

A representation had been made that, as the oysters on those beds did not exceed 2 1/2 or 2 3/4 inches in size, unless fishermen were permitted to take oysters of smaller size than the present regulation covers they could not make the fishing profitable.

In itself, however, the claim as to the undersize of the oysters on those beds was not strictly correct, as besides undersized ones, specimens of 3 inches or over were obtained, as the following tabulation will show:—

Under 3 inches		3 inches and over	
11	1	3	2
1	1	3½	2
2	2	3½	1
2½	3	3½	1
2	2	3½	2
2	5	3½	1
2	2	3½	1
2	1	4	1
2	2	4½	2
19		13	

Measurements according to the beds were: Oyster point, 11 below legal size and 2 above 3 inches; Egg island, 4 below legal size and 5, 3 inches or over; and Blue rock, 4 below legal size and 6, 3 inches or over.

But everything considered, and allowing for what has been shown about there being oysters of larger size than represented, the beds, especially Oyster Point bed, were in poor shape. No wonder that there are not enough oysters within the present regulation size to make the fishing profitable, for there could be little chance, with such a crowd of boats operating on the beds, for many of the undersized or coming up oysters to exceed the minimum regulation size.

As a matter of fact it was hard work to get fishermen to distinctively show where the location of the Blue Rock bed was, as a spot apart from the entire area over which the boats were operating, and all that can be said from what had been seen is, it cannot be long, under the present condition, before all three beds will be depleted of oysters of three inches or over in size.

That is the condition of the Oyster point bed now, and the percentage of oysters measured from that bed was about 84½ under regulation size and about 15½ over three inches.

During the time of the shell-fish investigations two demonstrated addresses were delivered to the fishermen and fishery officers. One was a talk on the oyster in the schoolhouse at Upper Caraquet, and the other a talk on the scallop and lobster at Alberton. As opportunity was afforded I had also conversations concerning shell-fish with fishermen personally or in groups.

In the course of the fiscal year various questions bearing on the natural history of marine or other aquatic organisms were referred to me, and a collection of fishes from the arctics made by Mr. J. D. Soper, was by request of the Victoria Memorial Museum examined by me, and an account of the same, entitled: "Notes on a collection of Arctic Fishes," the result of the examination, was sent to the museum, a copy of which is on file.

## APPENDIX No. 4

## REPORT OF C. BRUCE, A.M.E.I.C., FISHERIES ENGINEER

Work in this branch included that under the headings,—

- (a) Clearing Rivers and Building Fishways.
- (b) Fish Culture.
- (c) Biological Stations.
- (d) General.

Under the heading "Clearing Rivers and Building Fishways" the following works were performed:—

## NOVA SCOTIA

*Salmon River, Yarmouth County.*—Owing to representations that fishways should be installed in several dams on this river, a general inspection was made. The first two dams from the mouth of the river are opened up to the passage of fish by about the first of April allowing both salmon and alewives to ascend as far as Hooper lake. Evidence was obtained that no good purpose would be served in opening the river above this point as it is small and sluggish and, moreover, the bottom is in many places full of old decayed sawdust to considerable depth.

*Eel River, Yarmouth County.*—Inspection was made relative to the necessity for having a guardian on duty during the time alewives are running.

*Barrington River, Shelburne County.*—Inspections of the fishways in the Woollen Mill and Electric Light dams made. Owing to representations that salmon were ascending the tailrace channels from both of these dams, providing thereby favourable poaching conditions, arrangements were made to have these channels screened during the period when salmon are ascending. Arrangements were also made for some slight improvement to the fishway in the Electric Light dam.

*Jordan River, Shelburne County.*—The fishway in the dam at the mouth of the river was rebuilt, the type of construction being changed to improve it. A wing dam was also built to confine the water around the foot of the fishway and a channel opened from this to the centre of the river.

The fishway in the second dam was altered so that the lower entrance would be submerged during low water.

The cost of work above outlined was \$643.27.

*Green Harbour River, Shelburne County.*—During the last several years a fair run of salmon has been entering this river, possibly due to the facts that the Jordan river, not far distant, was blocked and that the development of electric power has stabilized the flow to a greater extent than was the case formerly. An inspection of the river was made to determine the necessity for deepening shallow portions to make them more readily accessible for salmon. Owing to abnormally high water during the early fall it was impossible to carry out the works contemplated.

*Mersey River, Liverpool County.*—The fishways built in the five dams on this river in 1923, have proved eminently satisfactory. The first return of salmon in any appreciable numbers was noted in 1926, and during the season

of 1927, angling was good with large catches. Some small repairs were made to the concrete wing walls of the fishways where frost had broken off pieces during the previous winter. Owing to the liability of debris collecting and blocking the upper entrances of the first two fishways heavy log booms were provided. The expenditure entailed was \$193.67.

An inspection was made of the storage dam at Indian Gardens at the foot of lake Rossignol and plans prepared for a fishway therein, but owing to later information that the Nova Scotia Power Commission would likely proceed with extensive power developments during the season of 1928, no action to require this fishway was taken.

*Petite Riviere, Lunenburg County.*—A general inspection was made of the fishways on this river and arrangements made for improving conditions at the Conquerall Mills dam, enlarging one of the pools in the fishway and opening up a channel in the river bed below to give salmon a better opportunity of ascending during low water. An expenditure of \$100 was involved in this work.

*La Have River, Lunenburg County.*—An inspection of the fishway built by Messrs. Hollingsworth and Whitney in the second dam on this river was made and directions given regarding some modifications which were necessary on account of errors in construction.

Following an inspection of De Long's dam on the North Branch of the La Have river, directions were given the owner regarding the construction of a run-round fishway to replace an old wooden fishway which was in such a poor state of repair as to be ineffective.

*Lequille River, Annapolis County.*—An inspection was made of the fishway in the hydro-electric power dam owned by the town of Annapolis on this river, and the mayor was interviewed regarding the repair of the concrete walls and floor which were broken down in some places.

*Annapolis River, Annapolis County.*—The fishway in the hydro-electric power dam at Lawrencetown was inspected and conditions found to be normal.

*Nictaux River, Annapolis County.*—An inspection was made of the work done the previous year at Nictaux Falls, which included several concrete wing dams. Conditions were found to be much improved and a passage for salmon over the falls is now considered to be assured at practically all stages of water. The question of improving the fishway in the hydro-electric power dam at the head of the falls was looked into, but no decision to do any work was reached, as salmon have got past the dam with very little difficulty.

An inspection was made of the Charles Rogers dam on this river, and as a result of investigation it was decided that a new concrete fishway should be built. Surveys were made from which designs will be made with a view to having the fishway built in the summer of 1928.

*Cornwallis River, Kings County.*—Plans for a fishway having been previously served on Mr. J. W. Cook, owner of a small dam on this river, a further inspection was made to arrange for details regarding which Mr. Cook was desirous of having further information.

*Gaspereaux River, Kings County.*—Owing to increased fluctuation in the head of water at the hydro-electric power dam on this river at White rock, arrangements were made to effect some slight modifications to the upper entrance of the fishway to reduce the velocity of water.

*Herbert River, Hants County.*—An inspection and survey were made for the construction of a fishway in a small dam recently built by Mr. Ira S. Crowe. Plans for the fishway were subsequently prepared.

*Meander River, Hants County.*—An inspection was made of an old dam on this river which had recently been closed for log driving purposes. In an interview with the owner it was agreed that he would provide an opening through the dam to permit the passage of salmon during the period of the run, in lieu of building a fishway.

*Osier River, Halifax County.*—An inspection of the fishway built during the spring in Boutillier's dam was made.

*Nine Mile River, Halifax County.*—At the request of Messrs. Geo. Fraser & Sons, Timberlea, that plans for a fishway in their dam on this river be supplied, a survey was made and the plans subsequently sent to them.

A small obstruction to the passage of salmon was removed at a cost of \$5.

*Ingram River, Halifax County.*—An inspection was made of the fishway in Messrs. Miller Brothers' dam. Conditions were found to be unsatisfactory, the dam being in such a leaky condition that it would not retain a head of water sufficient to supply a fishway. An arrangement was made with the owners to undertake certain repairs to the fishway.

*Ship Harbour River, Halifax County.*—An inspection and survey were made for a fishway in the dam at the foot of Ship Harbour lake and plans were subsequently furnished to the owners of the dam. This fishway is to replace one that was not wholly effective.

*Tangier River, Halifax County.*—An inspection of the fishway near the mouth of the river was made and slight repairs arranged which were carried out by the overseer at a cost of \$3.38.

*East River Sheet Harbour, Halifax County.*—An inspection of the fishway built by the Nova Scotia Power Commission in their intake dam at Ruth Falls hydro-electric power development was made and the Commission notified regarding some slight modifications which were considered desirable to make it more effective.

In Cape Breton Island a number of the smaller streams require some attention every year. Owing to the hilly nature of the country and consequent heavy run-off during freshets they frequently become obstructed with old logs, uprooted trees and debris which in many cases form a complete barrier to the ascent of trout and salmon. Obstructions of this nature are removed by day labour under the supervision of the fishery overseer. The following is a list of the streams from which obstructions were removed with the cost:—

Southwest brook, Cape Breton county.....	\$249 25
Northwest brook, Cape Breton county.....	50 00
Ferguson's brook, Cape Breton county.....	49 50
Nicholson's brook, Cape Breton county.....	44 95
Benacadie river, Cape Breton county.....	48 95
Big brook, Inverness county.....	20 00
Murray's brook, Richmond county.....	269 95

#### NEW BRUNSWICK

*Mispec River, St. John County.*—There has been for a number of years a stone dam at the mouth of this river, upwards of fifty feet in height. The question of providing a fishway for salmon has been considered on a number of occasions previously, but owing to the heavy cost of construction and doubt as to the efficiency of any structure which might be built, no action was taken.

Last year a large gate through the dam, at a height about six feet above the bottom, was blown out by persons interested in providing a passage for salmon. Following this it was observed that salmon were attempting to ascend by jumping at the gate opening, but were unable to do so.

Surveys were made for the provision of a fishway which would enable their ascent.

*Hammond River, St. John County.*—An inspection was made of a dam on this river which, it was alleged, prevented the ascent of salmon. The dam, which was originally built for log-driving purposes was unused and the gates were open. As the ascent through the gate openings only involved a jump of about two feet, it was not considered that any action to improve conditions was necessary. Later investigation confirmed this view, information being obtained that salmon were seen above the dam.

*Skiff Lake, York County.*—An examination and survey were made at the outlet of this lake for data in connection with the provision of screens to prevent the descent of land-locked salmon into the outlet stream, from which, it was alleged they were unable to return.

*Aroostook River, Victoria County.*—The Aroostook river, a tributary of the St. John river, is practically all in the state of Maine. The Aroostook Power Company has a large hydro-electric dam on the river a short distance above the confluence. While the Canadian Government has not been interested in the river, owing to the fact that any salmon ascending would be for the benefit of the state of Maine, the Government of that state has urged that provision be made for the ascent of salmon. At the request of the Commissioner of Inland Game and Fisheries for Maine, an inspection of the dam was made in company with officials of his department. As a result of the conference following the inspection, it was agreed that the State Department would undertake to provide a fishway and make all the necessary arrangements with the Power Company relating thereto.

#### MANITOBA

Following an inspection of several rivers, in previous years, designs for fishways in several dams were prepared and furnished to the owners of the dams for execution of the work.

During the current year, fishways were built in the following locations by the companies indicated:—

Whitemud river, at Gladstone, Canadian Pacific Railway.

Whitemud river, at Westbourne, Canadian Pacific Railway.

Ochre river, at Ochre, Canadian National Railway.

Vermilion river, at Dauphin, Canadian National Railway.

Pipestone creek, at Bellview, Canadian National Railway.

#### SASKATCHEWAN

Designs were furnished and fishways built during the current year as follows:—

Qu'Appelle river, at Craven, Department of Public Works.

Gravelbourg, Canadian National Railway.

#### ALBERTA

Designs were furnished and fishway built during the current year by the Canadian Pacific Railway in their dam on the Vermilion river.

#### BRITISH COLUMBIA

*Marble Creek, Vancouver Island.*—An obstruction consisted of an accumulation of debris, logs, roots and stumps extending for a distance of one hundred and fifty feet in the stream bed and piled twenty feet high within the canyon walls. All material above water level was cut and blasted into small pieces which, it was expected, would float to sea in freshet. Subsequently it was reported that certain submerged logs which could not be dealt with at the time, had come to the surface and in their course down the stream had lodged in

a narrow stretch of river holding up a portion of the cut material as well as all drift being carried down by the stream. The removal of this new jam is being attended to so as to ensure the permanence of the main work. The removal of this obstruction was under the supervision of the engineers, the cost being \$1,676.55.

A number of smaller obstructions were removed from streams under the direct supervision of the overseer or guardian, in each instance, as follows:—

Owen creek.....	at a cost of \$	25 35
Capilano river.....	" "	4 00
Two Mile creek.....	" "	12 47
Oke-over arm.....	" "	12 00
Koeve river.....	" "	25 87
Goldstream.....	" "	96 40
Owes-Sit-Sa creek.....	" "	22 00
Nicomeki river.....	" "	53 40
Serpentine river.....	" "	28 75
Wakefield river.....	" "	20 00
Fishermans river.....	" "	140 00
Ruby, Bear and Lee creeks.....	" "	100 00
Village Bay creek.....	" "	11 12
Isolem river.....	" "	27 80
Eastern creek.....	" "	35 55
Black creek.....	" "	15 90
Sauch-en-Auch creek.....	" "	47 36
Bust creek.....	" "	7 00
103rd creek.....	" "	6 85
Kapriuo river.....	" "	28 00
Johnson river.....	" "	29 75
Nimkish creek.....	" "	19 20
Fish lake.....	" "	35 50
Shuswap falls.....	" "	8 10

*Stamp River, Vancouver Island.*—A fishway was built over Stamp falls, under the direct supervision of the engineering staff, at a cost of \$7,015.58. The work involved the excavation of 648 cubic yards of solid rock and the placing of 91 cubic yards of concrete. Owing to unusually high water, the execution of the work was a matter of considerable difficulty and completion was retarded until the latter end of September, when the main body of the sockeye run was over. Those salmon arriving after completion of the work passed up through the fishway without difficulty. This fishway will be the means of relieving the situation at this point which, in the past, has made necessary the passing of fish over the falls by hand.

*Fraser River, Bridge River Falls.*—A fishway was excavated entirely in solid rock, under the direction of the engineering staff, at a cost of \$643.17. Owing to the great range of water in the canyons and narrow places on the Fraser river, such fishways are useful only during the particular stages of the river for which they are intended. This fishway was built to operate at the lowest stages of flow which was only recorded for a very short period of time during last season. The conditions for this stage of water have been greatly improved by the fishway.

*Nicola Lake.*—A fishway thirty-six feet long and six feet wide was incorporated in the dam constructed during the year at the foot of Nicola lake, near the town of Nicola, B.C., permitting salmon to pass without difficulty.

*Hell's Gate, Fraser River.*—Owing to the fact that salmon are unable, at certain stages of water, to negotiate the rapids at Hell's Gate, a board of Engineers comprising representatives from the Department of Public Works, the Water Power and Reclamation Service, the provincial Department of Fisheries, and the federal Department of Fisheries, was formed, to carry out investigations looking to the necessity and possible means of improving conditions at this point.

Complete surveys of the canyon at Hell's Gate were conducted, cable stations established for measuring velocities and gauges set both above and

below the gate, from which studies of all conditions affecting velocities, turbulence, etc., were made. The cost of these investigations, which are still in progress was \$2,166.55, and considerable time of the engineering staff was devoted them.

*Baker River Fishway.*—This project which involves an elevator designed to take salmon over a dam about two hundred and sixty-five feet high, located on Baker river, in the state of Washington, was carefully examined and such data as was available secured.

*Buckley River (Hagwelogat Canyon).*—An inspection was made and report prepared on the possibility of damage to the river by the construction of new bridge abutments.

*Puntledge River.*—Inspection was made of obstructions and directions given regarding the reconstruction of the fishway in the impounding dam of the Canadian Collieries (Dunsmuir).

*Prospect Lake.*—An inspection of the fishway was made.

Under the heading "Fish Culture," the following works were performed:—

#### NOVA SCOTIA

*Yarmouth Hatchery.*—A careful examination was made of a number of streams in Yarmouth county for the purpose of selecting a site for a salmon and trout hatchery establishment, involving surveys to obtain levels and volumes of discharge. The site finally approved by the department at the outlet lake George was surveyed for the necessary property and water rights.

*Antigonish Hatchery.*—Complete surveys of a site for a salmon and trout hatchery establishment were made at Fraser's Mills on the South river, this site having been approved by the department after a number of others had been eliminated.

*Windsor Hatchery.*—Owing to the pollution of the stream from which the water supply for the Windsor Hatchery is obtained by large gypsum mining operations, it was necessary to give consideration to the selection of a new site. Several streams were examined and preliminary surveys conducted to determine their suitability for hatchery purposes.

#### NEW BRUNSWICK

*Florenceville Hatchery.*—Plans and specifications were prepared and contract let and completed for the construction of a salmon and trout hatchery establishment at White Marsh creek, near Florenceville, N.B. The work under this contract included the main building eighty-nine feet ten inches long, and twenty-three feet wide, and a combination garage and ice house thirty-two feet long by eighteen feet wide.

The main building contains a six-room dwelling house for the superintendent at one end and two rooms for the assistant with an office over at the other. The hatching room proper is fifty-three feet long, one storey, with side and roof lighting. The equipment includes thirty hatching troughs, standard design, sixteen feet long. Floors of the hatchery are of concrete throughout and in designing it a new feature was introduced, consisting of twelve floor tanks each twelve feet long, two feet two inches wide, and one foot deep, two tanks being placed under each cluster of hatching troughs. The tanks are supplied independently with water from the overflow of the hatching troughs and are designed primarily as a means of relieving congestion during the hatching period.

The dwelling is heated with hot air furnace, and equipped with sanitary plumbing, the water supply for which is obtained from a well by an automatic electric pumping equipment, and the waste from which is discharged into a septic tank. All buildings throughout are lighted by electricity.

The garage building contains accommodation for two cars or trucks, an ice room with cold chamber for keeping feed for rearing of fry, and storage room overhead.

The water supply for the establishment is obtained from the reservoir formed by building an earth embankment dam with concrete core-wall, discharge gates and inlet gates, the dam being about one hundred and fifty feet long and twelve feet high at the gates. Water is conducted to the hatchery by a six inch wire wound wood stave pipe and to the rearing pond system by a similar pipe ten inches in diameter.

The rearing pond system consists of eight ponds each one hundred and twenty-six feet long, five feet wide and four feet deep, constructed with concrete side walls and gravel bottoms, each pond being fed independently from the water supply. On account of the lateness of the season, only five of these ponds were completed, but excavations for the balance were removed and the whole left in readiness for completion next year.

The construction of the dam and rearing ponds was done by day labour, under the direct supervision of the Engineers.

*St. John Hatchery.*—The rearing and brooding facilities at this hatchery were extended by the construction of fourteen ponds, of varying lengths to suit the ground location, the total length being twenty-one hundred and twenty-eight feet. Ponds are all four feet wide with side walls of concrete and bottoms of gravel. The water supply is obtained from Little river reservoir, a new eight-inch wood stave pipe being installed and from a large spring from which an eight-inch pipe was also laid. Both sources of water supply are led into a concrete tank where they may be mixed as desired thus regulating to a certain extent, the temperature of the water before it enters the head trough of the pond system. The ponds are arranged so that each may be supplied separately from the head trough or the water may, if desired, be circulated through two, three, or more from one supply.

The entire pond system was enclosed in a link chain wire fence three feet high with a twelve-inch band of smooth galvanized iron around the top to prevent the entrance of mink.

Electricity having become available during the year, the buildings, including dwelling, hatchery and garage, were wired and equipped with lighting fixtures. Several lights were also established around the pond system controlled by switches from the dwelling, as a protection against possible poaching.

The hot air furnace in the dwelling was repaired and one new register with heating pipe installed.

*Restigouche Hatchery.*—Extensive repairs were made to the establishment including the renewal of one half the floor in the hatchery, shingling the north slope of the roof, repairing foundations, and installing a sanitary closet combination in the superintendent's quarters. The roofs of several outbuildings were reshingled and repairs made to the water supply to the hatchery.

#### ALBERTA

*Lesser Slave Lake Hatchery, Alberta.*—An inspection, covering the entire length of the lake, was made for the selection of a site for a whitefish hatchery in Lesser Slave lake. The location finally decided upon as being most suitable is at Canyon creek on the south side of the lake, about eighteen miles from the lower end. The lake is quite shallow around the shores and is, moreover,

subject to extremely heavy ice floes during the break up in the spring. In the selection of the site, it was necessary to find a location that provided fairly deep water at a reasonable distance from the shore, in order that a water supply could be obtained. Protection against the heavy run of ice was also necessary to insure reasonable safety for the intake pipe.

A contract was awarded for the construction of the hatchery in the fall of the year. The main building is seventy-six feet long and forty feet wide, fitted with eight hundred and eighty-eight hatching jars providing capacity for one hundred and thirty million whitefish eggs.

The ground floor is laid out for the hatching room and engine room and the upper floor is entirely taken up with living quarters which comprise a six room apartment for the superintendent and seven rooms for the accommodation of the staff.

Plans and specifications were prepared for a wharf four hundred feet long which was necessary to provide harbour for the hatchery boats and protection for the intake pipe.

The work in connection with this establishment will not be completed until next autumn.

*Waterton Lakes Park Hatchery, Alberta.*—An inspection covering a number of streams in southern Alberta was made for the selection of a site for a Trout hatchery. The location finally decided upon is in the Waterton Lakes National Park. A contract was awarded for the construction of a hatchery forty-four feet long by twenty-four feet wide and a one storey cottage for the superintendent, thirty-two feet six inches long and twenty-two feet six inches wide.

The hatchery is divided into two rooms, one thirty-one feet by twenty-three feet providing the hatching room and the other twenty-three feet by twelve feet being fitted as a garage for the hatchery truck.

The hatching room is fitted with fifteen standard hatching troughs sixteen feet long, and six concrete tanks in the floor, two under each cluster of hatching troughs, each two feet wide and fourteen feet long. Provision has been made so that in the event of operations becoming larger, the space occupied by the garage may be converted into additional hatching room. The water supply is obtained by gravity through an eight-inch wood stave pipe from Spring creek where a small concrete dam was built to provide a reservoir.

The dwelling is fitted with sanitary plumbing, the water supply for which is piped from Spring creek, the discharge being into a septic tank. A hot air furnace is provided for heating.

*Jasper Park Subhatchery, Alberta.*—A subsidiary hatchery was arranged in a long cabin nineteen feet long by fifteen feet wide, a building formerly used by one of the park guardians. Ten standard hatching troughs were installed with the other requisite equipment, providing a capacity for two hundred and fifty thousand Trout eggs.

#### BRITISH COLUMBIA

*Nelson Hatchery, B.C.*—Improved quarters for the troughs and equipment of this hatchery were obtained in the basement of the Armoury in Nelson, and the hatchery was moved into them.

*Summerland Hatchery, B.C.*—A concrete block building thirty feet long and sixteen and one-half feet wide was purchased from the municipality of Summerland for the establishment of a small hatchery on Okanagan lake, the water supply being from the overflow of springs used by the municipality for water services.

The building was refloored and fitted with a whitefish battery of fifty-two jars and with eight standard hatching troughs for trout, each fourteen feet long.

In the basement, under the main floor, a whitefish tank for fry, twenty feet long and four feet wide, and two tanks for trout fry, each twenty feet long by three feet wide, were installed. The building is lighted by electricity.

*Stuart Lake Hatchery, B.C.*—The entire foundation logs, and such of the wall logs as were rotted, were renewed with sound timber. The work was done under the supervision of the engineering staff with local labour.

*Francois Lake Hatchery, B.C.*—A survey was made by the engineering staff for purposes of estimate for a site and construction of a hatchery. A small log building was built on the Nadina river flowing into Francois lake, to provide shelter for egg-planting operations in that district.

*Lakelse Hatchery, B.C.*—A new boat-house and marine ways were constructed to house the new hatchery boat, which is considerably longer and heavier than the one it replaced.

Under the heading "Biological Stations", the following works were performed:—

*Marine Laboratory, Eastern Passage, Halifax County.*—Following the decision by the department to erect this station, the site was inspected and afterwards acquired. A number of conferences were held with Dr. A. G. Huntsman, Director of the Fisheries Experimental Station, after which plans and specifications for the laboratory were prepared. The building is seventy-five feet long and thirty-two feet six inches wide, with basement, one floor above and attic space for storage, supply-tanks, etc. Construction is concrete foundations and hollow tile walls faced with brick work. The basement has concrete floor and is subdivided into several rooms required for laboratories, work room and engine room.

The first floor is reinforced concrete construction supported on columns, and subdivided into the several laboratories, common room and office.

The building is equipped with sanitary plumbing, electric lighting and electrical outlets for laboratory purposes.

Under the heading "General" may be classed the inside work of the engineering staff, which included the preparations of numbers of plans for equipment, special maps relating to the fisheries and the preparation of reports and other office work.

The engineering staff supervised the establishment of anchorages for fishing boundary signs at Big Qualicum, Little Qualicum river and Oyster river, in British Columbia.

## APPENDIX No. 5

## FISHERIES

## FINANCIAL STATEMENT, 1927-28

Vote No.	Service	Appropriation	Expenditure
		\$ cts.	\$ cts.
246	(Salaries and disbursements, fishery officers....\$ 428,520 33 Fisheries Patrol Service..... 275,182 60 Fisheries Protection Service..... 196,613 18		
		910,000 00	900,316 11
247	Building fishways, etc.....	20,000 00	14,319 06
248	Legal and incidental expenses.....	5,000 00	4,006 17
249 and 505	Conservation and development of deep sea fisheries.....	130,000 00	129,878 91
250	Fisheries Intelligence Bureau.....	1,000 00	561 57
251	Inspection of pickled fish.....	26,000 00	24,894 85
252	Fish culture.....	410,000 00	349,141 63
253 and 506	International Halibut Commission.....	28,500 00	31,652 54
254	Marine Biological Board.....	138,000 00	138,000 00
337	Compassionate allowance to widow of late F. Askew.....	2,000 00	2,000 00
		1,670,500 00	1,594,770 84
17 and 436	Civil Government salaries.....	107,220 00	93,617 81
17 and 436	Contingencies.....	28,500 00	27,795 77
Stat'y	Fishing bounty.....	160,000 00	158,375 80
		1,966,220 00	1,874,560 22
535	To provide for increases to Civil Service, both inside and outside.....		10,440 92
	Gratuities.....		350 00
	Superannuation Fund No. 5 (Act 1924).....		1 82
			1,894,361 96



## EXPENDITURE, 1927-28—DETAILED STATEMENT OF SALARIES AND DISBURSEMENTS OF FISHERY OFFICERS

Provinces	Inspectors and Overseers		Allowances			Gasoline and Oil	Special Guardians		Sundry	Total
	Salaries	Disb.	Auto	Boat	Horse		Wages	Expenses		
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
<i>Nova Scotia—</i>										
General Account.....	12,526 64	1,425 13							1,211 85	15,163 62
Nova Scotia No. 1.....	15,240 00	2,746 43	3,200 00	750 00		115 33	13,148 83	45 67	143 84	35,360 10
" No. 2.....	18,385 43	4,607 58	4,096 76	400 00		180 28	8,436 11	1,143 28	143 28	37,392 72
" No. 3.....	19,455 00	4,577 62	4,000 00		300 00		9,950 62	74 94	148 58	38,546 76
Halifax School.....		30 50								30 50
<i>Prince Edward Island—</i>										
Prince Edward Island No. 1.....	65,607 07	13,387 26	11,286 76	1,170 00	300 00	295 61	31,575 56	1,263 89	1,047 55	126,523 70
" No. 2.....	9,332 76	2,102 47	1,200 00				1,575 71	7 20	221 73	14,439 87
" No. 3.....	1,485 00	521 95		112 50		63 25	273 00		81 90	2,537 60
<i>New Brunswick—</i>										
New Brunswick No. 1.....	10,937 90	1,658 40	1,500 00	300 00		187 57	3,675 00	82 53	170 16	18,491 56
" No. 2.....	16,561 13	3,181 19	2,606 68	922 38		888 10	15,224 85	680 97	761 05	40,829 35
" No. 3.....	9,226 62	1,549 33	700 00	168 75	75 00	150 52	12,877 13		78 89	24,826 24
<i>Quebec.....</i>	36,725 65	6,388 92	4,809 68	1,391 13	75 00	1,226 19	31,776 98	763 50	990 10	84,147 15
<i>Manitoba.....</i>	9,585 00	4,212 02		525 00	875 00	422 77	2,800 15	2,633 55	81 87	21,135 36
<i>Saskatchewan.....</i>	10,710 48	4,120 60	225 00	225 00	1,000 00		1,098 75	2,137 10	76 79	19,593 72
<i>Alberta.....</i>	10,987 50	4,600 48	225 00	300 00	450 00	311 81	2,359 00	1,993 42	758 55	22,075 76
<i>British Columbia—</i>										
General Account.....	19,826 32	2,083 98							4,424 43	26,344 73
British Columbia No. 1.....	10,865 01	8,306 31					12,087 42	7,734 87	911 52	39,998 13
" No. 2.....	13,455 74	4,176 32					8,506 49	757 67	3,895 66	30,791 88
" No. 3.....	15,090 00	7,921 27					3,757 20	785 15	533 71	28,087 33
<i>General Account.....</i>	59,247 07	22,400 88					24,351 11	9,277 69	9,765 32	125,132 07
									12,790 26	12,790 26

# FISHERIES BRANCH

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## SUMMARY

Provinces	Inspectors and Overseers		Allowances			Gasoline and Oil	Special Guardians		Sundry	Total
	Salaries	Disb.	Auto	Boat	Horse		Wages	Expenses		
Nova Scotia.....	65,607 07	13,387 26	11,206 76	1,150 00	300 00	295 61	31,575 56	1,263 89	1,647 55	126,523 70
Prince Edward Island.....	10,817 76	2,624 42	1,200 00	112 50		63 25	1,848 71	7 20	303 63	16,977 47
New Brunswick.....	36,725 65	6,388 92	4,809 68	1,391 13	75 00	1,226 19	31,776 98	763 50	990 10	84,147 15
Quebec.....		53 25							91 59	144 84
Manitoba.....	9,585 00	4,212 02		525 00	875 00	422 77	2,800 15	2,633 55	81 87	21,135 36
Saskatchewan.....	10,710 48	4,120 60	225 00	225 00	1,000 00		1,098 75	2,137 10	76 79	19,593 72
Alberta.....	10,887 50	4,690 48	225 00	300 00	450 00	311 81	2,359 00	1,993 42	758 55	22,075 76
British Columbia.....	59,247 07	22,490 88					24,351 11	9,277 69	9,765 32	125,132 07
General Account.....									12,700 26	12,790 26
	203,080 53	57,967 83	17,756 44	3,703 63	2,700 00	2,319 63	95,810 26	18,076 35	26,505 66	428,520 33

## EXPENDITURE 1927-28—DETAILED STATEMENT OF FISHERIES PATROL SERVICE

Establishments and Accounts	Paylist	Board or Prov'n.		Fuel		Repairs		Supplies		Clothing		Sundry		Total	
	\$ cts.	\$	cts.	\$	cts.	Hull	Engine	Engine	Deck	Stewards	\$	cts.	\$	cts.	\$
<i>Nova Scotia—</i>															
General account.....	2,343 03	24 90	363 02	198 81	232 96	120 89	127 09	54 23	10 00	8 82	27 73	3,501 48	10 00		
"F.P. No. 1".....	3,730 71	2 60	602 20	250 48	73 49	480 99	85 95	169 94	29 61	1,431 61	2,064 83	5,594 51			
"McCull", (chartered).....	478 06		68 03			87 13									
<i>New Brunswick—</i>															
"Phalarope".....	4,015 00	27 50	1,033 25	449 29	306 45	689 01	213 04	224 17	38 43	1,637 88	11,170 82				
"Seal".....															
"Lloyd Geo. (chartered).....	645 00		911 53	61 59	421 64	236 24	26 41	26 59	8 82	30 96	5,738 78				
"Pontiac" (chartered).....	432 00	123 99	24 16							560 00	827 00				
"Shannon" (chartered).....	2,300 00		413 45							760 00	1,340 15				
<i>Prince Edward Island—</i>															
"Richmond".....	7,392 00	123 99	1,349 14	61 59	421 64	236 24	26 41	26 59	8 82	1,897 43	11,543 85				
"Cock of North" (chartered).....	1,092 70		169 81		12 00	126 28		7 00		60 54	1,468 33				
"Dora" (chartered).....	399 68									125 00	434 68				
"Gander" (chartered).....	600 00									250 00	850 00				
"Leona" (chartered).....	445 17									275 00	720 17				
"Lucy" (chartered).....	464 52									275 00	739 52				
"Mary" (chartered).....	900 00									550 00	1,450 00				
"Olive" (chartered).....	709 68									250 00	850 00				
"White Star" (chartered).....	296 78									296 20	1,005 88				
<i>Manitoba—</i>															
"Bradbury".....	5,418 53		169 81		12 00	126 28		7 00		2,205 74	7,940 36				
<i>British Columbia—</i>															
General Account.....	7,219 16	2,297 66	4,019 57	Cr. 73 39	Cr. 33 98	1,039 58	510 19	212 76	297 95	133 61	15,623 11				
Poplar Island Whse.....	2,861 21	68 59	55 88	9 45	311 95	104 17	9 00		7 22	39,040 79	42,468 26				
<i>Departmental Boats District No. 1—</i>															
"Elkhorn".....	1,140 00		113 90	95 05	45 16	100 52	22 60	74 93	12 80	477 07	2,082 03				
"Foam Crest".....	3,420 00		550 10	7 80	61 49	5 91	5 50	18 75	15 00	28 29	4,112 84				
"Humming Bird".....	4,500 00		304 65	16 63	204 85	10 97	41 22	46 00	13 47	40 07	5,213 86				
"Merry Sea".....	4,500 00	455 70	2 00	33 25	132 67	203 86	21 21	63 48	11 66	221 66	5,769 06				

"Salmo".....	4,488 00	3 15	0 50	10 50	14 15	14 15
"Swan Tail".....	3,420 00	595 18	37 41	9 31	56 13	5,354 27
"Vedder River".....		305 00	1 00	7 64	32 25	3,862 91
<i>District No. 2—</i>						24,362 34
"Babine No. 1".....	700 00	94 20	5 20		97 40	937 32
"Babine No. 2".....	700 00	94 20			20 00	861 86
"Beldis".....		39 00			204 42	263 42
"Bonilla Rock".....	2,191 12	845 45	121 25	21 82	59 43	3,990 36
"Coyah".....	2,546 56	636 06	32 50	64 50	44 02	4,120 02
"Collice Bay".....						7 77
"Hawk Eye".....	1,291 94	203 97	24 75	14 85	20 70	2,002 00
"Heron Wing".....	1,889 49	624 83	46 90	118 01	38 34	3,318 36
"Linnett N.".....	1,193 55	282 12	19 70	23 30	4 07	1,985 49
"Marfish".....	5,438 66	1,886 67	587 28	250 18	153 06	11,287 41
"Merlin B".....						263 57
"Medra".....	4,593 26	1,817 39	73 75	102 29	68 53	8,513 91
"Nasago".....		39 00			204 43	257 43
"Revidis".....	2,732 14	666 00	104 45	68 30	40 19	4,614 92
<i>District No. 3—</i>						42,423 82
"Black Raven".....	1,290 32	439 30	42 22	47 87	108 31	2,950 28
"Egret Plume".....	1,375 00	297 40	223 81	15 16	202 38	2,613 16
"Gull Wing".....	1,500 00	156 25	222 59	26 88	82 97	2,318 07
"Pursepa".....	250 00	130 99		15 85	202 89	603 61
"Vandis".....	6,480 00	484 96	134 05	116 20	185 93	10,712 35
<i>Chartered Boats—</i>						19,197 47
<i>District No. 1—</i>						
"Iron Bark".....		51 25			111 05	222 98
"Jean No. 2".....	437 41	67 51			141 50	662 90
"Mary".....	823 23	57 81			415 60	1,309 37
"Minota".....	360 00	79 69			93 00	547 78
"W.C.T.".....	1,100 00	44 43			374 90	1,532 38
<i>District No. 2—</i>						4,275 41
"Amy S".....	787 50	314 62			927 00	2,109 91
"Argo".....	346 19	56 96			429 00	845 43
"Boe".....	387 17	34 04			412 00	833 21
"Dallas Ford".....	414 29	161 24			549 10	1,144 79
"Double A".....	1,023 39	234 34			973 00	2,249 80
"Ecoba".....	460 00	172 79			732 00	1,404 43
"Elida".....	1,001 62	244 65			1,088 00	2,389 98
"Fishers".....					648 00	1,555 01
"Flying Spar".....	751 00	119 51			1,152 60	2,410 29
"Full Moon".....	877 10	293 73			1,305 00	2,686 53
"Grizzly".....	928 46	428 44			9 12	9 12
"Irene R".....	791 67	85 24			0 75	0 75
"Ironides".....					1,280 00	2,400 54
"Kiki".....	939 92	148 42			3 04	

## EXPENDITURE 1927-28—DETAILED STATEMENT OF FISHERIES PATROL SERVICE—Continued

Establishments and Accounts	Paylist cts.	Board or Prov'n.	Fuel		Repairs		Supplies			Clothing	Sundry		Total
			\$	cts.	\$	cts.	Engine	Deck	Stewards		\$	cts.	
"Kitsault"	765 76								1 60		1,000 00		\$ 2,107 49
"Lella"	495 97		265 62				74 51		1 52		612 00		1,333 99
"Melrose"	638 71		174 13				50 37		3 04		523 50		1,259 42
"Moose"	765 00		67 97				26 20		3 58		824 00		1,919 72
"Myfawny"	420 24		257 01				70 13		1 52		600 00		1,170 22
"Nereis"			109 02				39 44				350 00		350 00
"Oh Boy"	787 50		256 86				79 45		5 04		1,070 00		2,198 85
"Omar K"	667 74		76 34				33 00		3 04		1,329 12		1,329 12
"Oswego"	918 88		87 72				16 46		2 46		1,000 00		2,025 52
"Oyashimo"	1,132 26		161 80				16 81		3 78		1,078 00		2,392 65
"Rose"	11 50										162 00		173 50
"See Bee"	1,110 00		553 45				68 02		5 76		1,208 00		2,945 24
"Sea Foam"	910 64		222 00				22 75		3 12		992 00		2,150 51
"Seminole"	780 00		170 53				36 21		9 12		954 00		1,949 86
"Sun Beam No. 2"	1,157 98		409 59				70 01		5 76		1,581 05		3,370 17
"Velma"	667 74		116 66			145 75	15 57		3 04		549 00		1,352 01
"Venture"	997 50		230 94				84 14		1 52		1,224 00		2,538 10
"Wabash"	861 05		553 07				38 35				1,160 00		2,612 47
													54,767 12
<i>District No. 3—</i>													
"Albo"	546 67		81 00				22 00		6 00		167 00		822 67
"Ban Box"	496 67		89 70				29 00				153 00		768 37
"Betty N"	493 33		69 35				5 15				152 00		719 83
"C.H."	153 33		25 30				5 82				48 00		232 25
"Charles"	146 67		29 04				1 85		0 24		45 00		232 80
"Colby"	1,104 85		226 04				64 48		3 04		1,025 95		2,424 36
"Crab"	153 33		12 65				3 12				47 50		216 60
"Curlew"	264 52		88 47				21 41				80 00		454 40
"Daisy"	496 67		91 70				31 90				186 00		806 27
"Dana"	108 17		30 59				12 43		1 52		32 00		184 71
"Deep Sea"	340 32		41 96				17 25				104 00		503 53
"Dorothy N"	1,200 00		75 91				29 72				588 11		1,893 74
"Dot"	1,200 00		257 45		1 60		62 50	3 03			316 50		1,841 11
"Dunno"	433 87		82 45				6 50				184 40		707 22
"Elsie"	267 85		13 60				2 85		3 20		82 00		366 30
"Esperanza"	1,145 16		428 04				79 33				553 50		2,209 23
"Esther K"	806 45		552 22				45 90		11 77	5 25	1,962 94		3,384 53
"Ethel"			118 80				19 20				182 90		320 90

## District No. 3—Cont.—

"Fisher"	264 52	33 50	6 95	0 70	81 00	386 67
"Georgia M"	156 67	8 97	8 40		75 00	75 00
"Gipsy"	283 87	29 27	13 97		48 70	222 63
"Haslam"	230 00	62 67	16 50		175 00	702 09
"Iona"	103 00	16 00	1 87		68 00	377 24
"Johnson"	103 77	16 00	1 87		27 00	148 62
"Jones"	232 80	29 90	1 75		71 00	235 45
"Klinekwa"					45 00	45 00
"Lena"	153 32	13 80	6 24		48 50	221 87
"Limit"	124 62	9 89	2 08	0 46	28 60	175 65
"Lively"	106 56	26 61	2 86		35 00	171 03
"Marfish"	766 67	108 00	8 40		246 77	1,134 89
"Maud L"	196 67	27 98	5 11	5 07	60 27	290 01
"M. E. Smith"	1,231 29	199 50	17 77		815 50	2,464 04
"Northwind"	203 33	13 40	5 80		62 00	284 52
"Olive"	523 34	54 87	7 47		122 00	747 66
"Pilling"	383 87	59 20	1 00		118 00	502 07
"Pontiac"	1,200 00	128 25	19 50		371 00	1,718 75
"Reliance"	1,580 81	55 13	32 52	4 61	1,526 00	3,199 07
"Rene"	200 00	17 91			62 00	279 91
"Repentance"	301 61	170 00	6 50		91 00	569 11
"Roberts"	101 07	9 89	3 81	0 46	31 00	146 23
"Roona"	9 68				36 00	45 68
"Sara S."	277 42	49 45	11 10	6 00	87 00	430 97
"S. & E."	440 00	145 20	28 37		137 00	750 55
"Sayward No. 1"	361 83	9 77	5 00		159 80	570 38
"Sea Dog"	1,000 00	18 40	4 68	3 04	276 00	1,294 40
"Sisters"	200 00	19 32	6 10		62 00	289 04
"S.O.S."	101 51	5 52	7 35		30 00	143 13
"Speedwell"	506 67	43 24	17 25		156 60	713 26
"Stubbs"	493 33	63 00			154 00	727 58
"Susie M"	329 33	104 00	11 60		98 00	542 63
"Tango"	277 42	47 84	14 20		86 00	425 46
"Three Flowers"	156 67	42 55	11 47		48 70	236 19
"T.M.G."	658 06	52 33	4 30		204 50	919 19
"Wonder No. 2"	156 67	42 55	15 53		48 50	263 27
"Wonder No. 3"		9 20	1 76			10 96
	105,789 6	21,187 97	5,707 98	2,097 62	80,175 78	228,804 46

SUMMARY

Nova Scotia.....	6,551 80	27 50	1,033 2¢	449 29	306 4¢	689 0	213 04	224 17	38 43	1,637 88	11,170 82
New Brunswick.....	7,300 00	123 96	1,349 14	61 59	421 64	236 24	26 41	26 59	8 82	1,897 43	11,543 85
Prince Edward Island.....	5,418 56	.....	169 81	.....	12 00	126 28	.....	7 00	.....	2,206 74	7,940 36
Manitoba.....	7,219 16	2,267 66	4,019 57	Cr. 73 39	Cr. 33 98	1,039 58	510 19	212 76	297 95	133 61	15,623 11
British Columbia.....	105,789 62	4,359 28	21,197 97	1,829 71	6,292 4¢	5,707 99	1,006 87	2,097 62	447 16	80,175 78	228,904 46
	132,369 11	6,808 43	27,769 74	2,267 20	6,998 57	7,799 10	1,756 51	2,568 14	792 36	86,051 44	275,182 60

EXPENDITURE 1927-28—DETAILED STATEMENT OF FISHERIES PROTECTION SERVICE

<i>General Account.</i> .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44 11	44 11
<i>East Coast—</i>											
Arleux.....	24,159 53	4,560 5¢	5,475 88	2,074 38	1,482 2¢	621 8¢	1,384 0¢	630 2¢	1,302 2¢	1,044 40	42,735 49
Arras.....	25,473 20	5,141 64	10,706 93	1,768 5¢	2,192 88	987 64	2,080 30	493 82	1,502 50	1,233 51	51,580 97
	49,632 73	9,702 19	16,182 81	3,842 93	3,675 13	1,609 4¢	3,464 37	1,124 11	2,804 7¢	2,277 91	94,316 46
<i>West Coast—</i>											
General Account.....	22,044 10	5,306 30	7,226 9¢	487 91	3,741 44	756 77	308 16	715 60	1,448 61	11 50	11 50
Givenchy.....	29,983 92	6,491 0¢	12,124 87	2,938 83	1,636 66	992 90	1,708 78	1,420 66	1,495 96	692 59	42,665 43
Malaspina.....	52,028 02	11,797 39	19,351 82	3,426 74	5,378 10	1,749 67	2,016 94	2,136 26	2,944 57	782 01	59,575 63
										1,423 10	102,252 61

SUMMARY

General Account.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44 11	44 11
East Coast.....	49,632 73	9,702 19	16,182 81	3,842 93	3,675 13	1,609 4¢	3,464 37	1,124 11	2,804 7¢	2,277 91	94,316 46
West Coast.....	52,028 02	11,787 39	19,351 82	3,426 74	5,378 10	1,749 67	2,016 94	2,136 26	2,944 57	1,423 10	102,252 61
	101,660 75	21,499 58	35,534 63	7,269 67	9,053 23	3,359 16	5,481 31	3,260 37	5,749 36	3,745 12	196,613 18

## FINANCIAL STATEMENT, 1927-28

## EXPENDITURE, 1927-28—DETAILED STATEMENT OF FISH CULTURE

Hatcheries	Salaries	Maintenance	Total of Hatchery	Total of Provinces
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Nova Scotia.</i>				
Halifax School.....				28,148 93
Antigonish.....		944 10	944 10	
Bedford.....		25 60	25 60	
Lindloff.....	2,390 45	4,323 54	6,713 99	
Margaree.....		991 47	991 47	
Margaree Pond.....	4,271 61	4,982 24	9,253 85	
Middleton.....	192 00	1,454 18	1,646 18	
Windsor.....	1,440 00	5,141 21	6,581 21	
Yarmouth.....	1,500 00	92 53	1,592 53	
		400 00	400 00	
<i>Prince Edward Island.</i>				
Kellys Pond Hatchery.....	2,820 00	2,265 20	5,085 20	5,085 20
<i>New Brunswick.</i>				
Florenceville.....				102,131 24
Grand Falls.....		32,703 52	32,703 52	
Miramichi.....	2,995 00	2,809 95	5,805 95	
Miramichi Pond.....	3,120 00	3,519 92	6,639 92	
Nepisiquit.....	90 58	2,604 16	2,694 74	
New Mills Pond.....	547 23	871 09	1,418 32	
Restigouche.....	852 68	2,918 73	3,771 41	
Sparkle.....	2,313 42	4,500 70	6,814 12	
St. John Hatchery.....	523 51	133 55	657 06	
St. John Pond.....	2,820 00	28,579 23	31,399 23	
Tobique.....		9,933 36	9,933 36	
		293 61	293 61	
<i>Ontario.</i>				
Collingwood.....		25 38	25 38	25 38
<i>Manitoba.</i>				
Dauphin River.....				22,954 22
Dauphin River Spawn Camp.....		1,689 01	1,689 01	
Gull Harbour.....		1,919 12	1,919 12	
Winnipegosis.....	1,680 00	5,555 54	7,235 54	
	1,890 00	10,220 55	12,110 55	
<i>Saskatchewan.</i>				
Qu'Appelle.....	2,940 00	4,852 50	7,792 50	7,792 50
<i>Alberta.</i>				
General Account.....		14 00	14 00	44,100 92
Banff.....	3,120 00	3,748 70	6,868 70	
Cold Lake.....		1,225 84	1,225 84	
Jasper Park.....		1,115 68	1,115 68	
Lesser Slave Lake.....	241 50	24,619 09	24,860 59	
Spray Lakes.....		1,459 58	1,459 58	
Waterton Park Hatchery.....		8,565 53	8,565 53	
<i>British Columbia.</i>				
General.....	7,860 00	3,229 78	11,089 78	112,532 65
Anderson.....	2,058 64	4,797 64	6,856 28	
Babine.....	2,164 86	5,017 75	7,182 61	
Cowichan.....	3,537 50	3,584 55	7,122 05	
Cranbrook Eyeing Station.....	468 21	717 55	1,185 76	
Cultus.....	1,039 98	3,779 07	4,819 05	
Gerrard.....	510 97	1,207 41	1,718 38	
Harrison.....	227 75	832 12	1,059 87	
Kennedy.....	2,230 15	4,760 66	6,990 81	
Lloyd's Creek Eyeing Station.....	815 64	1,120 52	1,936 16	
Nelson Eyeing Station.....	1,924 61	4,652 71	6,577 32	
Pemberton.....	5,017 25	7,968 70	12,985 95	
Pitt.....	1,200 00	4,797 05	5,997 05	
Rivers Inlet.....	2,731 70	9,985 52	12,717 22	
Skeena.....	3,479 36	12,150 22	15,629 58	
Stuart.....	1,454 19	5,064 31	6,518 50	
Summerland.....	185 81	1,960 47	2,146 28	
General Account.....	5,940 00	20,421 59	26,361 59	26,361 59
	78,595 60	270,546 03		349,141 63

## MARINE AND FISHERIES

## SUMMARY

Hatcheries	Salaries	Maintenance	Total of Hatchery	Total of Provinces
Nova Scotia.....	9,794 06	18,354 87	28,148 93	
Prince Edward Island.....	2,820 00	2,285 20	5,085 20	
New Brunswick.....	13,263 42	88,867 82	102,131 24	
Ontario.....		25 38	25 38	
Manitoba.....	3,570 00	19,384 22	22,954 22	
Saskatchewan.....	2,940 00	4,852 50	7,792 50	
Alberta.....	3,361 50	40,748 42	44,109 92	
British Columbia.....	36,906 62	75,626 03	112,532 65	
General Account.....	5,940 00	20,421 59	26,361 59	
	78,595 60	270,546 03	.....	349,141 63

## EXPENDITURE, 1927-28—DETAILED STATEMENT OF CONSERVATION AND DEVELOPMENT OF DEEP SEA FISHERIES

*Under Department—*

General Account.....	\$ 4,676 36
Destruction hair seals.....	22,088 87
Scallop investigation.....	122 06
Transportation of fish.....	18,685 79
Royal Commission.....	66,901 70
Salmon investigation.....	415 49
Marine Laboratory.....	3,896 32
	<u>\$ 116,786 59</u>

*Under Biological Board—*

Demonstration building.....	\$ 11,334 41
Herring investigation.....	628 03
Lobsters.....	958 41
Fraser River currents.....	171 47
	<u>13,092 32</u>
	<u>\$ 129,878 91</u>

FISHERIES EXPENDITURE, 1927-28—SUMMARY BY PROVINCES

FISHERIES BRANCH

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Appropriation	General		Nova Scotia		Prince Edward Island		New Brunswick		Quebec		Ontario		Manitoba		Saskatchewan		Alberta		British Columbia		Total	
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
Salaries and disbursements, fishery officers.....	12,790	26	126,523	70	16,977	47	84,147	15	144	84			21,135	36	19,593	72	22,075	76	125,132	07	428,520	33
Fisheries Patrol Service.....			11,170	82	7,940	36	11,543	85					15,623	11					228,904	46	275,182	60
Fisheries Protection Service.....	10,588	74	83,493	74	278	09													102,252	61	196,613	18
Fish culture.....	26,361	59	28,148	93	5,085	20	102,131	24			25	38							112,552	65	349,141	63
Building fishways, etc.....		3	2,105	57			3	60											12,206	26	14,319	06
Conservation and development of D.S.F.	71,578	06	45,243	94	696	15	2,596	79											9,763	97	129,878	91
Fisheries Intelligence Bureau.....	301	05	48	00	92	52	120	00													561	57
Inspection of pickled fish.....	51	55	17,914	62	1,215	72	2,028	01	194	93									3,490	02	24,894	85
International Halibut Commission.....	31,652	54											244	60			360	00			31,652	54
Legal and incidental expenses.....			261	80			842	79											2,296	98	4,006	17
Compassionate allowance to widow of F. Askew.....																					2,000	00
Marine Biological Board.....	138,000	00																			138,000	00
Fishing Bounty.....			82,107	00	12,095	45	19,906	80	44,266	55											158,375	80
Totals.....	291,327	21	399,018	12	44,380	96	223,320	23	44,606	32	25	38	59,957	29	27,386	43	66,545	68	596,579	02	1,753,146	64
Civil Government salaries.....																					93,617	81
Contingencies.....																					27,795	77
Increases to Civil Service, inside and outside.....																					19,449	92
Gratuities.....																					350	00
Superannuation Act No. 5.....																					1	82
																					1,894,361	96

## APPENDIX No. 6

LIST OF UNITED STATES FISHING VESSELS WHICH ENTERED  
CANADIAN PORTS ON THE PACIFIC COAST DURING THE  
YEAR ENDED DECEMBER 31, 1927

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed cwts.
A.L. 573.....	5	1	1	Shelter.....	
Akutan.....	46	9	9	Sell fish.....	3,260
Alaska.....	18	5	1	Bait and ice.....	
Alaska.....	57	10	5	Sell fish.....	1,400
Albatross.....	40	13	11	Bait, sell fish and ice.....	1,640
Active.....	8	3	1	Sell fish.....	
Acton.....	7	2	1	".....	400
Addington.....	26	6	6	" , bait and ice.....	1,000
Agnes.....	17	5	1	Bait and ice.....	
Agnes R.....	6	2	1	Shelter.....	
Alf. E.....	9	4	1	Supplies.....	
Alice B.....	17	5	2	Bait and ice.....	
Alitak.....	14	5	7	Engine trouble, bait and ice.....	
Alken.....	7	3	1	Sell fish.....	60
Alki.....	7	3	10	".....	680
Aloha.....	19	6	12	" , bait and ice, supplies.....	
Alten.....	43	10	7	".....	2,620
Altik.....	37	10	1	".....	440
America.....	25	11	10	Bait and ice.....	
Angeles.....	28	6	7	".....	
Anna B.....	5	1	1	Shelter.....	
Anna J.....	22	6	11	Sell fish.....	1,640
Antler.....	22	5	9	Land sick man, orders, bait and ice.....	
Arcade.....	14	4	9	Bait and ice.....	
Arctic.....	29	7	5	Sell fish.....	1,460
Areil.....	7	2	1	Shelter.....	
Argo.....	26	6	9	Sell fish, bait and ice, supplies.....	180
Arrow.....	40	9	8	".....	1,940
Atlantic.....	24	9	10	" , orders.....	3,160
Atlas.....	31	7	9	".....	2,840
Attu.....	37	11	3	".....	540
Augusta.....	19	5	3	".....	360
Aurora.....	16	5	2	Bait and ice.....	
Bainbridge II.....	3	2	1	Shelter.....	
Baltic.....	20	5	3	Sell fish.....	420
Beaver.....	17	5	4	Bait and ice.....	
Beaver.....	5	2	1	Shelter.....	
Bell M. 894.....	4	1	1	".....	
Bertha.....	11	4	3	Bait and ice, shelter.....	
Bertha.....	4	2	1	Towing Canadian boat in distress.....	
Betty.....	15	5	4	Sell fish, fuel.....	220
Betty Jane.....	34	6	6	Bait and ice, fuel.....	
Bill.....	4	3	3	Shelter.....	
Birdie B.....	4	3	2	Supplies.....	
Blanco.....	25	6	3	Sell fish, fuel.....	260
Blanco.....	12	3	6	Bait and ice.....	
Bonanza.....	30	6	7	Sell fish.....	1,880
Boonvoll II.....	27	6	5	Bait and ice.....	
Bravo.....	14	3	3	Sell fish.....	360
Brisk.....	37	9	8	Bait and ice, sell fish.....	1,680
Brothers.....	13	5	5	Sell fish.....	620
Brunvall.....	28	4	1	".....	360
Bruvold.....	37	7	9	".....	2,180
Bunt Ina.....	4	2	1	Supplies.....	
California.....	20	5	12	Bait and ice, supplies, engine trouble, shelter.....	
Cape Blanco.....	24	6	1	Bait.....	
Caroline.....	3	2	1	Shelter.....	
Cascade.....	7	1	1	".....	
Cedric.....	19	6	5	Sell fish.....	1,080
Chancellor.....	14	5	10	Bait and ice, supplies, sell fish, fuel, etc.....	60
Chelsea.....	51	9	9	Sell fish.....	3,300

List of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1927—Continued

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed
					cwts.
Chimera.....	9	3	6	Bait and ice, supplies.....	
Chum.....	6	3	3	Sell fish.....	180
Cohoe.....	7	2	1	Shelter.....	
Columbia.....	41	10	6	Sell fish.....	1,520
Commonwealth.....	60	10	6	Bait and ice, sell fish.....	1,620
Constitution.....	39	10	9	" " " ".....	1,920
Corona.....	19	11	10	" " " ".....	120
Curlew.....	18	5	10	" " " ".....	
Daily.....	26	6	7	Sell fish.....	1,280
Dave.....	4	1	1	Shelter.....	
De.....	11	3	1	".....	
Decker J.....	16	5	1	Bait and ice, landed fish.....	22
Defence.....	20	5	4	Sell fish.....	450
Democrat.....	27	6	8	".....	1,620
Diana.....	22	6	7	Bait and ice, orders.....	
Discovery.....	10	4	11	" " " " sell fish.....	60
Dixie.....	7	2	1	Shelter.....	
Dora H.....	15	5	1	Bait and ice.....	
Dorothy.....	89	16	1	Sell fish.....	280
Dorothy M.....	6	2	2	Shelter.....	
Eagle.....	67	15	7	Sell fish.....	3,180
Eastern Point.....	4	2	15	".....	660
Echo 728 L.....	4	2	1	Shelter.....	
Eclipse.....	44	11	6	Bait and ice, sell fish.....	1,160
Eidsvold.....	15	5	3	" " " " orders and supplies.....	
Eldorado.....	47	11	6	Sell fish.....	1,600
Eleanora.....	16	5	3	Bait and ice and land fish.....	15
Electra.....	48	10	7	Sell fish.....	2,060
Elly.....	7	2	1	Shelter.....	
Emblem II.....	5	2	1	".....	
Eureka.....	11	4	16	Sell fish, fuel, etc.....	1,360
Evelyn.....	4	1	1	Assistance given "Hyada" with broken shaft.....	
Evolution.....	17	5	10	Bait and ice.....	
Exceed.....	8	1	1	Shelter.....	
Excel.....	27	3	2	".....	
Explorer.....	34	9	4	Sell fish.....	1,540
Fairway.....	19	5	2	".....	360
Flamingo.....	13	5	1	Fuel, etc.....	
Flattery.....	10	3	3	Sell fish.....	200
Flint.....	24	5	1	Bait.....	
Florence M. 1675.....	4	2	1	Shelter.....	
Foremost.....	66	10	8	Sell fish.....	3,380
Forerunner.....	4	2	1	Shelter.....	
Foreward.....	18	5	2	Sell fish.....	60
Forward.....	4	1	1	Shelter.....	
Frances W.....	6	2	1	".....	
Franklin.....	34	9	4	Sell fish.....	660
Freia.....	4	2	2	Shelter.....	
Fremont.....	10	5	7	Sell fish.....	580
557 G.A. I.....	4	2	1	Shelter.....	
G. 88 A.....	4	2	2	".....	
Galveston.....	21	5	1	".....	
Glacier.....	13	4	3	Sell fish.....	460
Gladstone.....	23	6	6	".....	1,360
Gloria.....	17	5	9	" " " " fuel, bait and ice.....	100
Going.....	6	2	1	Shelter.....	
Grant.....	51	9	12	Sell fish.....	4,400
Gray.....	11	2	3	Shelter.....	
Grayling.....	16	5	5	Sell fish.....	1,000
Grenburg.....	4	2	1	Shelter.....	
Gretchen.....	8	3	8	Bait and ice.....	
Hallo.....	16	5	1	".....	
Hanna.....	11	5	3	Sell fish, fuel.....	100
Happy.....	12	4	2	".....	320
Harding.....	19	5	5	Bait and ice.....	
Harold 638 L.....	3	2	1	Applying for Canadian Registry.....	
Havana.....	41	10	6	Sell fish.....	2,280
Hazel H.....	24	5	11	".....	2,000
Helgeland.....	56	15	9	".....	2,640
Hi Gill.....	12	4	4	".....	390

**List of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1927—Continued**

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed cwt.
Hooter.....	4	2	1	Shelter.....	
Hunter No. 2.....	11	6	1	".....	
Hunter No. 4.....	11	6	1	".....	
Imperial.....	23	6	8	Sell fish.....	1,240
Inger.....	7	3	2	".....	160
Ionic.....	24	6	1	Bait and ice.....	
Irene.....	30	7	3	Sell fish, supplies.....	560
Ithona.....	20	6	7	".....	1,280
Ivanhoe.....	27	7	7	".....	1,460
Jack.....	13	4	3	".....	540
Jennie F. Decker.....	16	5	1	Bait.....	
Jill 537 G.....	4	2	3	Shelter.....	
Joseph George.....	6	2	1	".....	
J. P. Todd II.....	12	5	6	Sell fish.....	680
Jumbo.....	3	2	1	Shelter.....	
June.....	15	4	6	Sell fish.....	720
June II.....	8	2	1	Shelter.....	
K. 452.....	5	2	1	Applying for Canadian Registry.....	
K. 911.....	4	2	1	Engine trouble.....	
Kanaga.....	47	9	6	Sell fish.....	1,180
Kanatak.....	39	9	2	".....	300
Katalla.....	16	5	3	" fuel.....	120
Kattie M. 681.....	5	2	2	Shelter.....	
Kodiak.....	38	13	5	Shell fish, fuel.....	1,380
L. 205.....	3	1	1	Shelter.....	
L. 321.....	5	1	1	Applying for Canadian Registry.....	
L. 335.....	4	1	1	Engine trouble.....	
La Paloma.....	14	11	11	Bait and ice, engine trouble, orders.....	
Larcing.....	16	5	3	Sell fish.....	440
La Verne.....	5	2	1	Water.....	
Leviathan.....	29	6	8	Sell fish.....	1,680
Lebanon.....	14	5	6	Bait, ice.....	
Liberty.....	44	15	6	Sell fish, bait and ice.....	960
Liberty 806 M.....	3	2	1	Applying for Canadian Registry.....	
Lief II.....	21	3	2	Sell fish.....	280
Lituya.....	30	9	6	".....	1,480
Life.....	6	2	1	Shelter.....	
Lola.....	4	2	2	Sell fish.....	100
Louise.....	16	5	11	Bait and ice.....	
Lummen.....	10	3	4	Sell fish.....	440
M. 131.....	5	1	1	Applying for Canadian Registry.....	
290 M.....	3	1	1	Shelter.....	
633 M.....	5	1	1	Applying for Canadian Registry.....	
M. 1064.....	4	2	1	Shelter.....	
M. 1084.....	4	2	1	".....	
M. 1699 The Boys.....	4	2	1	".....	
M. 1874.....	4	3	1	".....	
Mabel.....	5	2	1	Bait.....	
Madeline J.....	25	5	8	Shelter, bait and ice.....	
Magna.....	4	2	1	".....	
Majestic.....	33	9	7	Sell fish, bait and ice.....	2,540
Mankato.....	8	3	2	Bait and ice, land fish.....	9
Mankaton.....	11	2	1	".....	
Marguerite.....	7	2	1	Shelter.....	
Mariner.....	21	5	6	Bait and ice.....	
Marmot.....	30	8	9	Sell fish.....	
Mary.....	16	8	15	Bait and ice.....	
Mary Fischer.....	8	2	1	Shelter.....	
Mary L.....	7	2	1	".....	
Mary R.....	7	2	1	".....	
Mars.....	9	4	6	" bait and ice.....	
McKinley.....	38	10	9	Sell fish, bait and ice.....	2,420
Merkur.....	8	2	1	Shelter.....	
Memories.....	8	2	1	".....	
Mermaid.....	4	1	1	Sell fish.....	
Mermid.....	19	5	8	Bait, ice, supplies.....	
Middleton.....	24	6	4	Sell fish.....	900
Mildred.....	19	5	1	Bait and ice.....	
Mildred II.....	31	7	2	Sell fish.....	320
Milkof.....	42	11	1	Bait and ice.....	
Miro S.H. 48 A.....	4	2	1	Shelter.....	

LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1927—Continued

Name of Vessel	Tonnage	Number of men in crew	Tumber of times entered	Reasons for entry	Quantity of fish landed
					cwts.
Mitkoff.....	46	10	8	Sell fish.....	2,080
Munmie 284 T.....	5	2	1	Orders.....	
Muria.....	27	6	8	Sell fish.....	1,420
Myrtle.....	9	3	7	Bait and ice.....	
Naima.....	4	2	1	Shelter.....	
National.....	20	5	10	Sell fish, bait and ice.....	580
Nebraska.....	5	4	1	Shelter.....	
Neptune.....	43	13	11	Sell fish, bait and ice.....	1,680
New England.....	70	25	2	" " ".....	400
Nomad.....	15	4	1	Bait and ice.....	
Nordic.....	30	9	4	Sell fish, fuel.....	980
Norland.....	19	6	2	".....	380
Norma.....	6	2	2	".....	80
North.....	9	3	9	Bait and ice.....	
North.....	35	9	8	Sell fish.....	2,880
Northern.....	38	9	5	".....	1,340
Oceanus.....	26	6	8	Shelter, bait and ice.....	
O.K.....	3	2	1	".....	
O.K. K959.....	4	2	1	".....	
Omaney.....	34	10	4	Sell fish.....	1,040
Omah.....	18	5	16	".....	1,900
Orient.....	48	13	10	Bait and ice, orders, supplies.....	
Pacific.....	44	10	6	Sell fish, orders.....	1,900
Panama.....	35	13	10	" bait and ice.....	2,240
Paragon.....	69	15	5	" " ".....	1,540
Pershing.....	18	5	2	Shelter, bait and ice.....	
Pet.....	4	2	1	".....	
Phoenix.....	12	2	2	".....	
Pioneer.....	48	10	8	Sell fish.....	2,340
Pioneer III.....	26	5	5	Fuel, bait and ice.....	
Polaris.....	45	10	7	Sell fish.....	1,700
Portlock.....	36	9	5	".....	1,640
Presho.....	14	5	11	Bait and ice.....	
President.....	24	7	7	Sell fish.....	1,700
Prince.....	12	2	1	Shelter.....	
Prosperity.....	25	6	6	Sell fish.....	1,440
Puffin.....	18	4	1	Orders.....	
Radio.....	63	10	7	Sell fish.....	3,320
Ramora.....	4	2	1	Engine trouble.....	
Ranier.....	4	3	6	Sell fish.....	450
Ranier.....	39	9	9	".....	2,080
Rebel M. 1064.....	4	2	1	Shelter, engine trouble.....	
Reliance.....	8	4	3	Sell fish.....	140
Reliance.....	11	4	7	Fuel, bait and ice.....	
Reliance.....	14	4	4	Sell fish.....	600
Reliance.....	14	4	4	".....	380
Reliance I.....	19	5	5	".....	80
Reliance.....	25	5	1	".....	
Repeat.....	14	4	3	Bait and ice.....	
Republic.....	20	5	1	" " ".....	
Republic.....	51	15	6	Sell fish.....	1,620
Resolute.....	47	10	9	".....	3,500
Restitution.....	24	5	9	Bait and ice.....	
Roald Amundsen.....	22	6	6	Sell fish.....	800
Roamer.....	5	3	1	Shelter.....	
Romance.....	8	2	1	".....	
Rosario.....	16	5	2	" , bait and ice.....	
Roosevelt.....	18	5	2	Bait and ice.....	
Royal.....	2	1	1	Sell fish.....	20
Royal.....	15	5	7	Bait, ice.....	
Ruth.....	8	4	1	Sell fish.....	40
Ruth May.....	13	2	1	Shelter.....	
S. 896.....	3	2	1	".....	
Salome.....	16	5	1	Engine trouble.....	
Salome.....	7	2	2	Shelter.....	
Sammy.....	8	2	1	".....	
Sea Bird.....	5	2	1	".....	
Sea Bird.....	5	3	1	".....	
Sea Otter.....	4	3	1	".....	
Seattle.....	55	11	4	Sell fish.....	1,380
Seattle.....	3	1	1	Shelter.....	
2nd Mate.....	3	1	1	" , bait and ice.....	
Selma J.....	9	4	10	".....	

LIST of United States Fishing Vessels which entered Canadian Ports on the Pacific Coast during the year ended December 31, 1927—*Concluded*

Name of Vessel	Tonnage	Number of men in crew	Number of times entered	Reasons for entry	Quantity of fish landed
					cwss.
Senator.....	11	7	5	Sell fish.....	1,520
Sentinel.....	21	6	6	".....	1,380
Seymour.....	44	13	2	" , supplies.....	360
Sherman.....	18	5	4	".....	640
Sien d's.....	36	9	1	Bait and ice.....	
Silver Wain.....	4	2	1	Shelter.....	
Sirius.....	17	4	9	Sell fish.....	1,080
Sitka.....	50	10	7	".....	2,880
S.L. 60.....	4	2	1	Shelter.....	
Spray.....	20	6	3	Sell fish, bait and ice.....	560
Stampede.....	5	1	1	Shelter.....	
Star.....	18	3	2	Sell fish.....	180
Sumner.....	34	10	11	" , fuel.....	2,060
Sunde EE.....	36	9	4	".....	940
Sunset.....	37	9	9	".....	2,880
Superior.....	18	5	2	Bait and ice.....	
Superior.....	26	5	4	Sell fish.....	900
Swan.....	9	4	13	Shelter, bait and ice, supplies.....	
Sylvia.....	30	6	7	Bait and ice.....	
T. 435.....	5	2	1	Supplies.....	
Tahoma.....	18	6	8	Sell fish.....	1,120
Tatoosh.....	23	6	9	".....	2,360
Taybelle.....	8	2	1	Engine trouble.....	
Teddy J.....	13	5	6	Sell fish.....	800
Texas.....	16	5	3	Shelter, bait and ice.....	
Thelma II.....	26	6	7	Sell fish, bait and ice, orders.....	160
Thor.....	4	2	1	".....	20
Thor.....	25	13	8	" , bait and ice.....	1,380
Tordenskjold.....	39	13	10	" ".....	400
Trinity.....	41	10	6	".....	1,720
Trondreu.....	5	2	1	Shelter.....	
Tyce.....	13	4	3	Sell fish.....	380
Umatilla.....	8	2	5	Shelter.....	
Unamak.....	10	3	1	Sell fish.....	80
Unimak.....	22	5	10	Bait and ice.....	
Urama.....	27	7	1	Sell fish.....	160
Uranus.....	15	5	10	" , fuel, bait and ice, orders.....	80
Vansee.....	58	11	7	".....	2,680
Vega.....	6	2	1	Shelter.....	
Velero.....	6	3	10	Bait and ice.....	
Velva.....	6	2	4	Shelter, bait and ice.....	
Venture.....	36	15	2	Sell fish, bait and ice.....	180
Venus.....	4	3	2	".....	140
Venus.....	25	7	7	".....	1,480
Vermont.....	35	8	1	Fuel.....	
Verna.....	5	2	1	Shelter.....	
Vesta.....	17	5	10	Bait and ice, land fish, orders.....	5
Vestura.....	5	3	1	Sell fish.....	40
Viking.....	11	4	14	" , shelter, bait and ice.....	450
Virginia.....	33	6	1	".....	200
Visitor.....	4	2	1	".....	40
Volunteer.....	20	5	2	Bait and ice.....	
Wabash.....	6	3	10	Sell fish.....	360
Wa Wa K.903.....	4	1	1	Shelter.....	
Wanderer.....	4	2	1	Supplies.....	
Wave.....	7	3	12	Sell fish.....	720
Wesley.....	9	3	13	Shelter, bait, ice, supplies.....	
West.....	9	2	1	".....	
Western.....	41	9	10	Sell fish.....	4,420
Westjord.....	17	5	2	" , fuel.....	120
White Star 1177M.....	4	2	1	Shelter.....	
White Star.....	17	5	13	" , bait and ice, land fish.....	3
Wilson.....	19	5	11	Sell fish, bait and ice.....	440
Wireless.....	19	5	14	" , shelter, ice, supplies.....	520
Withelema.....	17	5	1	Bait, ice.....	
Wizard.....	49	10	6	Sell fish, bait and ice.....	300
Woodrow.....	23	5	11	" ".....	120
Wyaach.....	4	2	1	Shelter.....	
Yakutat.....	41	10	8	Sell fish, bait and ice.....	2,280
Yaquina.....	29	6	6	Bait, ice.....	
Yellowstone.....	22	6	2	Sell fish.....	180
Yukon.....	31	7	8	".....	2,140
Zenith.....	47	10	8	" bait, ice.....	2,520

## APPENDIX NO. 7

The following is a statement of the different kinds of licenses issued by the different Inspectors, during the 1927-28 season:—

## MAGDALEN ISLANDS, QUEBEC—INSPECTOR S. T. GALLANT

Kind of Licenses—	Number of Licenses Issued
Lobster fishing licenses.....	665
Lobster packing licenses.....	15
Lobster packing extensions—10.....	
Fish cannery licenses.....	1
Certificates under Sec. 63—3.....	
Herring trap-net licenses.....	25 (1 Cod Trap-net)
Herring seine licenses.....	21
	<hr/> 727

## PRINCE EDWARD ISLAND—INSPECTOR S. T. GALLANT

Lobster fishing licenses.....	2,110
Lobster packing licenses.....	133
Lobster Packing extensions—62.....	
Oyster fishery licenses.....	182
Quahaug fishing licenses.....	Nil
Fish cannery licenses.....	9
Certificates under Sec. 63—7.....	
Reduction works licenses.....	Nil
Trap-net fishing licenses.....	3
Lobster Pound licenses.....	1
Smelt gill-net licenses.....	332
Smelt bag-net licenses.....	257
	<hr/> 3,027

## NOVA SCOTIA—DISTRICT No. 1—INSPECTOR A. G. McLEOD

Lobster fishing licenses.....	2,006
Lobster packing licenses.....	47 (1 cancelled)
Lobster packing extensions—37.....	
Oyster fishery licenses.....	98
Fish cannery licenses.....	3
Certificates under section 63—48 (5 lost).....	
Reduction works licenses.....	Nil
Gaspereau & alewife fishing licenses (herring weir forms used).....	3
Trap-net fishing licenses.....	38
Salmon gill-net or drift-net licenses.....	26
Salmon trap-net, pound-net or weir license.....	175
Special angling permits.....	78
Lobster pound licenses.....	Nil
Smelt bag-net licenses.....	20
Smelt gill-net licenses.....	226
	<hr/> 2,720 (1 cancelled)

## NOVA SCOTIA—DISTRICT No. 2—INSPECTOR D. H. SUTHERLAND

Lobster fishing licenses.....	3,175 (1 cancelled)
Lobster packing licenses.....	51 (1 cancelled)
Lobster packing extensions.....—69 (2 cancelled)	
Oyster fishery licenses.....	95
Quahaug fishery licenses.....	Nil
Shad gill-net or drift net license.....	18
Fish cannery licenses.....	3
Certificates under section 63—93.....	
Reduction works licenses.....	4 (1 cancelled)
Seine licenses.....	139
Herring weir licenses.....	13
Trap-net fishing licenses.....	91
Salmon gill-net or drift-net licenses.....	358 (4 cancelled)
Salmon trap-net, pound-net or weir licenses.....	162 (3 cancelled)
Special angling permits.....	71
Scallop fishery licenses.....	7
Lobster pound licenses.....	2
Smelt bag-net licenses.....	212
Smelt gill-net licenses.....	290
Lobster pound certificates—74.....	
	<hr/> 4,691 (10 cancelled)

## NOVA SCOTIA—DISTRICT No. 3—INSPECTOR H. H. MARSHALL

## Kind of Licenses—Continued—

## Number of Licenses issued

Lobster fishing licenses.....	3,301
Lobster packing licenses.....	31
Lobster packing extensions—21.	
Shad gill-net or drift-net licenses.....	3
Fish cannery licenses.....	19
Certificates under section 63—174	
Reduction works licenses.....	10 (1 cancelled)
Herring weir licenses.....	64
Trap-net fishing licenses.....	129 (2 cancelled)
Salmon gill-net or drift-net licenses.....	239
Salmon trap-net, pound-net or weir licenses.....	53
Salmon net permits.....	42
Special angling permits.....	704
Scallop fishery licenses.....	321
Lobster pound licenses.....	12 (1 cancelled)
Smelt bag-net licenses.....	24
Smelt gill-net licenses.....	76
Lobster pound certificates—155.	
	<hr/> 5,028 (4 cancelled)

## NEW BRUNSWICK—DISTRICT No. 3—INSPECTOR H. E. HARRISON

Shad gill-net or drift-net licenses.....	282
Sturgeon fishery licenses.....	13
Whitefish fishery licenses.....	13
Salmon net permits.....	172
Gaspereau pound-net or trap-net licenses.....	27
Salmon gill-net or drift-net licenses.....	120
Salmon trap-net, pound-net or weir licenses.....	109
Bass fishery licenses.....	43
Smelt gill-net licenses.....	1
Smelt bag-net licenses.....	Nil
	<hr/> 780

## NEW BRUNSWICK—DISTRICT No. 1—INSPECTOR J. F. CALDER

Lobster fishing licenses.....	532
Shad gill-net or drift-net licenses.....	46
Fish cannery licenses.....	10
Certificates under section 63—2.	
Reduction works licenses.....	3
Herring weir licenses.....	574
Clam permits.....	103
Salmon gill-net or drift-net licenses.....	87
Herring seine licenses.....	1
Scallop fishery licenses.....	2
Lobster pound licenses.....	4
Smelt gill-net licenses.....	Nil
Smelt bag-net licenses.....	Nil
Lobster pound certificates—130.	
Lease of dark harbour fishing privileges—1.	
	<hr/> 1,362

## NEW BRUNSWICK—DISTRICT No. 2—INSPECTOR A. L. BARRY

Lobster fishing licenses.....	1,980
Lobster packing licenses.....	126 (1 cancelled)
Lobster packing extensions 32.	
Oyster fishery licenses.....	673
Quahaug fishery licenses.....	69
Shad gill-net or drift-net licenses.....	Nil
Fish cannery licenses.....	4
Certificates under section 63—212.	
Reduction works licenses.....	Nil
Herring weir licenses.....	Nil
Gaspereau pound-net or trap-net licenses.....	32
Salmon gill-net or drift-net licenses.....	76
Salmon trap-net, pound-net or weir licenses.....	402
Scallop fishery licenses.....	Nil
Lobster pound licenses.....	4
Bass fishery licenses.....	32
Smelt gill-net licenses.....	138
Smelt bag-net licenses.....	5,502
Lobster pound certificates—236.	
	<hr/> 9,038 (1 cancelled)

# FISHERIES BRANCH

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## MANITOBA—INSPECTOR J. B. SKAPTASON

### Kind of Licenses—Continued—

### Number of licenses issued

Reduction works licenses (issued by R.C.M.P.).....	1
Commercial sturgeon fishery licenses.....	142
Domestic sturgeon fishery licenses.....	118
Special angling permits.....	560
Pound-net licenses.....	16
Special fishery licenses.....	3,047 (4 cancelled)
Settler's permits.....	1,369
Receipt books—57.....	
	5,853 (4 cancelled)

## SASKATCHEWAN—INSPECTOR G. C. MacDONALD

Commercial sturgeon fishery licenses.....	Nil
Domestic sturgeon fishery licenses.....	Nil
Special angling permits.....	214
Commercial and fisherman's fishery licenses.....	861 (14 cancelled)
Domestic fishery licenses.....	137 (1 cancelled)
Indian and half-breed permits.....	853
	2,065 (15 cancelled)

## ALBERTA—INSPECTOR R. T. RODD

Fish cannery licenses.....	Nil
Special angling permits.....	5,221 (3 cancelled)
Receipt books—885 (3 cancelled)	
Indian and half-breed permits.....	952
Commercial and fisherman's fishery licenses.....	1,401 (15 cancelled)
Domestic fishery licenses.....	223 (10 cancelled)
	7,797 (28 cancelled)

## BRITISH COLUMBIA—INSPECTOR J. A. MOTHERWELL

Fish cannery licenses.....	10
Reduction works licenses.....	27
Special angling permits.....	45
Abalone fishery licenses.....	1
Indian permits.....	830 (6 cancelled)
Crab fishery licenses.....	148 (1 cancelled)
Smelt or sardine fishery licenses.....	69
Sturgeon fishery licenses.....	Nil
Miscellaneous licenses.....	160 (2 cancelled)
Salmon fishery licenses.....	4,886 (7 cancelled)
Salmon trolling licenses.....	3,005 (2 cancelled)
Salmon trap-net licenses.....	7
Salmon purse seine licenses.....	482 (1 cancelled)
Salmon drag-seine licenses.....	46
Licenses to a captain of a salmon (purse or drag) seine boat.....	414 (2 cancelled)
Salmon curing licenses.....	38 (1 cancelled)
Salmon cannery licenses.....	75
Boat license to buy fresh salmon from fishermen.....	263
License to a person engaged in cold storage or fish packing to buy fresh salmon from fishermen.....	69
Grayfish fishery licenses.....	237
Licenses to assistant operator of salmon (purse or drag) seine used under license No.....	2,156
Licenses to assistant in a boat used in operating a salmon gill-net or drift-net.....	1,111 (1 cancelled)
Cod fishery licenses.....	468 (1 cancelled)
Herring or pilchard gill-net or drift-net licenses.....	34
Herring or pilchard drag-seine licenses.....	1
Herring or pilchard purse-seine licenses.....	89
License to captain of herring or pilchard seine boat.....	80 (2 cancelled)
Herring or pilchard curing licenses.....	30
Whale factory licenses.....	2
Counterfoil of pelagic sealing certificates—17.....	
	14,783 (26 cancelled)

## YUKON

Special fishery licenses.....	34 (1 cancelled)
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## PACIFIC COAST

Licenses to United States fishing vessels.....	226
Total.....	58,131 (90 cancelled)

## APPENDIX NO. 8

## RETURN showing the Details of Prosecutions for Offences against the Fisheries Act during the Fiscal Year 1927-28

NOVA SCOTIA—DISTRICT No. 1—Inspector, A. G. McLEOD

Pros. Nos.	Name of Offender	Nature of Offence	Place of Offence	Result of Prosecution
1	Louis Varence	Fishing trout through the ice	Lake Ainslie	Fined \$200.00 and costs. Suspended sentence. Confiscation of 1 axe, 7 hooks, lines, and 4 trout.
2	Edward Young	Being unlawfully in possession of berried lobster	North Sydney	Fined \$15.00 and costs and confiscation of 1 berried lobster.
3	Edward Young	Unlawfully fishing for lobsters, violation of Sec. 18 of Regs.	Low Point, C.B.	Fined \$1.00 and costs and confiscation of 14 lobsters.
4	Henry Chiasson	Netting salmon	Barrack Pool, Margaree River	Fined \$10.00 and had confiscated 1 salmon net.
5	Pierre Fribould and Alfred Devaux.	Fishing lobsters after close season	North Sydney	Fined \$9.75 and costs each and confiscation of 4 lobster ring traps and 2 lobsters.

## NOVA SCOTIA—DISTRICT No. 2—Inspector, D. H. SUTHERLAND

1	Bert Tait	Illegal fishing of salmon	Powers Plant near Oxford	Fined \$5.00 and costs and had confiscated 1 salmon net.
2	Melvin Weeks	Fishing within 25 yards of the lower entrance to a dam.	Ship Harbour	Fined \$50.00 and costs or 30 days in jail—Suspended; and had confiscated from him 2 dip nets.
3	Melvin Weeks	Resisting arrest, violation of Sec. 50	"	Confiscation of 2 dip-nets.
4	Melvin Weeks	Having lobsters in her possession out of season	"	Confiscation of 2 dip-nets.
5	Mrs. John Muirhead	Having lobsters in his possession out of season	New Glasgow	Fined \$50.00 and confiscation 4 berried lobsters.
6	Geo. Mason	Having lobsters in his possession out of season	Ponds, Pickou County	Fined \$50.00 and costs and had confiscated 62 lobsters.
7	Fred Calquhoun	Having lobsters in his possession out of season	Little Harbour	Fined \$50.00 and costs and had confiscated 92 lobsters.
8	Warren Mills	Having lobsters in his possession out of season	Bayview	Fined \$5.00 and costs and had confiscated 54 lobsters.
9	Colin MacDonald	Having lobsters in his possession out of season	Bayview	Fined \$10.00 and costs or 30 days in jail; 54 lobsters confiscated jointly with W. Mills, Pros. 8.
10	John Muirhead	Selling lobsters in town	Westville	Fined \$50.00 and costs.

11	Carl Cochrane.....	Illegal salmon fishing.....	Port au Pique River.....	Fined \$5.00 and confiscated 1 salmon spear.
12	Clinton Miller.....	Illegal lobster fishing.....	East Wallace.....	Fined \$50.00 and costs and had confiscated 1 motor boat, 1 crate, 2 bags of lobsters.
13	R. M. Trenholm.....	Illegal fishing, having lobsters in possession.....	Pugwash, closed district.....	Fined \$50.00 and costs or 50 days in jail.
14	Roy Howard.....	Illegal salmon fishing.....	Wallace River.....	Fined \$12.00 and costs.
15	Geo. Smith.....	Having undersized lobsters in his possession.....	Halifax harbour.....	Fined \$25.00 and costs and had confiscated from him 28 lobsters.
16	Arthur Billard.....	Having undersized lobsters in his possession.....	Halifax Harbour, near George Island.....	Fined \$25.00 and costs and had confiscated from him 25 lobsters.
17	Purney Hurshman.....	Having lobsters under 9" in length.....	Near Halifax.....	Fined \$35.00 and costs and had confiscated from him 64 lobsters.
18	Charles P. Hurshman.....	Having lobsters under 9" in length.....	Near Halifax.....	Fined \$70.00 and costs or 60 days in jail, and had confiscated from him 64 lobsters. (These are the same lobsters as in Pros., No. 17.)

## NOVA SCOTIA—DISTRICT No. 3—Inspector, H. H. MARSHALL

1	Temory Dorey.....	Violation of Sub.-sec. 9, Sec. 36 of Fishery Act.....	LaHave River, near Bridge-water.....	Dismissed.
2	Chas. Weagle.....	Violation of Sub.-sec. 9, Sec. 36 of Fishery Act.....	LaHave River, near Bridge-water.....	Fined \$25.00 and costs or 30 days in jail.
3	Artemas Ramey.....	Fishing for salmon illegally.....	LaHave River, near Bridge-water.....	Sent to jail.
4	Angus Wile.....	Fishing for salmon illegally.....	LaHave River, near Bridge-water.....	Fined \$20.00 and costs or 20 days in jail.
5	George Smith.....	Taking a salmon illegally.....	Petite Riviere.....	Fined \$20.00 and costs or 20 days in jail.
6	Harry Dolliver.....	Fishing for lobsters without a license.....	Port Medway Harbour.....	Fined \$5.00 and costs and had confiscated 1 dip-net.
7	Raymond Selig.....	Setting salmon net without a license.....	South West Cove.....	Fined \$5.00 and costs.
8	Zacharias Conrad.....	Setting salmon net without a license.....	Great Island.....	Fined \$10.00 and costs.
9	Ernest Weagle.....	Illegally taking a salmon.....	LaHave River, Bridgewater.....	Fined \$100.00 and costs and 3 months in jail, and in default of payment, for a further period of one month.—Sent to jail.
10	Harold Kaizer.....	Having 4-inch gill-net, setting above the limit.....	West side of Gold River.....	Fined \$10.00 and costs.
11	Angus Nowe.....	Fishing for lobsters without a license.....	Medway Harbour.....	Fined \$5.00 and costs.
12	Norman Wymot.....	Using a swing-net.....	McLeod's Falls.....	Dismissed.
13	William Ramey.....	Using a swing-net.....	McLeod's Falls.....	Dismissed.
14	Chesley Kennis.....	Fishing a square net during weekly close season.....	Casperau, King County.....	Fined \$20.00 and costs.
15	Edward Newcomb.....	Obstructing river with wire netting.....	Melanson.....	Fined \$20.00 and costs and confiscated from him roll of wire netting.
16	Norman Adams.....	Dipping a salmon.....	Gold River.....	Fined \$5.00 and costs.
17	Arthur Hatt.....	Setting a net at Stillwater.....	Gold River.....	In favour of defendant; mistake in identity.

# RETURN showing the Details of Prosecutions for Offences against the Fisheries Act during the Fiscal Year 1927-28—Continued

## NOVA SCOTIA DISTRICT—No. 3—Concluded

Pros. No.	Name of Offender	Nature of Offence	Place of Offence	Result of Prosecution
18	Frank Mosher.....	Dipping for salmon.....	Middle River.....	Fined \$5.00 and costs.
19	Fred Countway.....	Dipping for salmon.....	Middle River.....	Fined \$5.00 and costs.
20	W. Fitch.....	Illegal fishing.....	Petite Riviere.....	Fined \$25.00 and costs.
21	Milton Corkum.....	Illegal fishing.....	Petite Riviere.....	Fined \$25.00 and costs.
22	Leonard Coleman.....	Unlawfully using a net to sweep or fish for salmon or shad.	Stevens Pool, Nictaux River.....	Fined \$50.00 and share of costs or one month in jail, and had confiscated one net.
23	Irving Morse.....	Unlawfully using a net to sweep or fish for salmon or shad.	Stevens Pool, Nictaux River.....	Fined \$50.00 and share of costs, or one month in jail, and had confiscated one net. This was the same net as in Pros. No. 22.
24	Harding Coleman.....	Unlawfully using a net to sweep or fish for salmon or shad.	Stevens Pool, Nictaux River.....	Fined \$50.00 and share of costs or one month in jail, and had confiscated one net. This was the same net as in Pros. No. 22.
25	Rolland Young, Angus Levy and Harvey Slaunwhite.....	Having lobster traps on board their boat.....	Tancook.....	Fined \$2.00 each and costs
26	Alden Roy.....	Fishing contrary to Sec. 4 (O.C. 17th Mar.) (O.C. 1st April, 1922).	Port Mouton Island.....	Fined \$50.00 and costs and confiscation of 3 lobster traps.
27	Earl Fisher.....	Contrary to Sec. 4 (O.C. 17th Mar., 1922) (O.C. 1st April, 1922).	Hunts Point.....	Fined \$15.00 and costs or 30 days in jail.
NEW BRUNSWICK—DISTRICT NO. 1—Inspector A. L. BAREY				
1	Albert Henderson.....	Having illegal lobsters in his possession.....	Grand Manan.....	Fined \$25.00.
2	The Mahoney Lumber Co.....	Allowing sawdust to enter Memramcook River.....	Near Calhoun.....	Fined \$20.00 and costs.
3	Roy MacAllister.....	Attempting to fish for shad in non-tidal waters.....	Petitcodiac River, near John Addy's Farm.	Fined \$10.00 and costs and had confiscated from him 60 ft. of net and 100 ft. cord rope.
4	C. I. Mills.....	Attempting to fish for shad non-tidal waters.....	Petitcodiac River, near John Addy's Farm.	Fined \$10.00 and costs and had confiscated from him 60 ft. of net and 100 ft. cord rope.
5	Chas. Alward.....	Attempting to fish for shad non-tidal waters.....	Petitcodiac River, near John Addy's Farm.	Fined \$10.00 and costs and had confiscated from him 60 ft. of net and 100 ft. cord rope.
6	Wallace McCarthy.....	Illegal lobster fishing.....	McBoyd Head.....	Fined \$200.00—Allowed to stand. Had confiscated from him 3 lobster traps, buoys, and 75 fms. lines, 6 lobster traps 1 crate.

7	Vincent McCarthy.....	Illegal lobster fishing.....	McBoyd Head.....	Fined \$200.00—Allowed to stand. Had confiscated from him—3 lobster traps, buoys, and 75 fms. lines, 6 lobsters 1 crate.
8	Geo. Stewart.....	Having illegal lobsters in his possession.....	Near Seal Cove.....	Fined \$25.00 and costs and had confiscated from him 7 illegal lobsters.
9	Freeman Dakin.....	Having illegal lobsters in his possession.....	Long Pond, Grand Manan.....	Fined \$25.00 and costs and confiscated from him 15 illegal lobsters.
10	William Dakin.....	Having illegal lobsters in his possession.....	Long Pond, Grand Manan.....	Fined \$25.00 and costs and confiscated from him 15 illegal lobsters.
11	Vernon Urquhart.....	Having illegal lobsters in his possession.....	Brown's Point Grand Manan.....	Fined \$60.00 and costs and had confiscated from him 63 illegal lobsters.
12	Harold Foster.....	Having illegal lobsters in his possession.....	Grand Harbour.....	Fined \$50.00 and costs—Allowed to stand.
13	E. L. Conley.....	Having illegally caught lobsters in his possession.....	St. George.....	Fined \$150.00 and costs and confiscated from him 300 lbs. lobsters.
14	William York.....	Illegal lobster fishing.....	Gardners' Creek.....	Fined \$200.00 Allowed to stand.
15	Roscoe Wilcox.....	Having illegal lobsters in his possession.....	Near Wood Island, Grand Manan.....	Fined \$25.00 and costs. Allowed to stand. Had confiscated from him 15 illegal lobsters.
16	Cecil Wilcox.....	Having illegal lobsters in his possession.....	Near Wood Island, Grand Manan.....	Fined \$25.00 and costs. Allowed to stand. Had confiscated from him 15 illegal lobsters.
17	Hum Fong.....	Selling undersized lobsters.....	King Cafe, St. John.....	Fined \$25.00. Allowed to stand. Had confiscated 25 boiled lobsters.
18	Wilfrid C. Day.....	Selling undersized lobsters.....	Hygienic Fish Market, St. John.....	Fined \$25.00.
19	Chas. Brown.....	Illegally fishing for salmon.....	Nixon Bridge, Albert Co.....	Fined \$10.00 and had confiscated from him 1 salmon spear.

## NEW BRUNSWICK—DISTRICT NO. 2—INSPECTOR J. F. CALDER

1	Valentine Muzzereall.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.....	Fined \$1.00 and costs.
2	Joseph D. Martin.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.....	Fined \$1.00 and costs.
3	Seberin Savoie.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.....	Fined \$1.00 and costs.
4	Ernest Durrell.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.....	Fined \$1.00 and costs.
5	John C. Martin.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.....	Fined \$1.00 and costs.
6	Rae Gibbs.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.....	Fined \$1.00 and costs.
7	John Muzzereall.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.....	Fined \$1.00 and costs.
8	Edward J. Martin.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.....	Fined \$1.00 and costs.

RETURN showing the Details of Prosecutions for Offences against the Fisheries Act during the Fiscal Year 1927-28—Continued

NEW BRUNSWICK—DISTRICT No. 2—Concluded

Pros. No.	Name of Offender	Nature of Offence	Place of Offence	Result of Prosecution
9	Lawrence Martin.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.	Fined \$1.00 and costs.
10	Lewis Collet.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.	Fined \$1.00 and costs.
11	Rodge Thibideau.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.	Fined \$1.00 and costs.
12	John Muchure.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.	Fined \$1.00 and costs.
13	Wilfrid Thibideau.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.	Fined \$1.00 and costs.
14	Fred Durrell.....	Setting lobster gear before the season opened.....	Baie Ste. Anne, Parish of Hardwicke.	Fined \$1.00 and costs.
15	Ben Legere.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
16	Beno Gallant.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
17	Clarence Gallant.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
18	Wright Gibbs.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
19	Edmore Theriault.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
20	Anthony Turbid.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
21	Clarence Jimmo.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
22	Cyriac Gaudet.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
23	William J. Manuel.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
24	Allain Gibbs.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
25	Cyrice Chiasson.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
26	Joseph Turbid.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
27	Mat Sipley.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
28	Isaac Theriault.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
29	Angus Tebo.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
30	Joseph Savoy.....	Setting lobster gear before the season opened.....	Pt. Escuminac.....	Case withdrawn.
31	David Savoy.....	Setting lobster gear before the season opened.....	Baie Ste. Anne.....	Fined \$1.00 and costs.
32	Bernard Williston.....	Selling lobster gear before the season opened.....	Bay du Vin.....	Fined \$5.00.
33	Theophile Breau.....	Fishing for oysters.....	Buctouche Bay.....	Fined \$30.00 and costs. Suspended sentence.
34	Alderic Melanson.....	Fishing for oysters.....	Buctouche Bay.....	Fined \$50.00 and costs. Suspended sentence.
35	Peter Joe and son Philip.....	Fishing for oysters in the close season.....	Miramichi Bay.....	Fined \$1.00 and had confiscated from him 2½ bbls. oysters.
36	Octave Duguay.....	Fishing for lobsters in close season.....	St. Morin, Shippegan Island.....	No fine-reprimanded.
37	Gordon Murdock.....	Fishing for oysters in close season.....	Hardwicke.....	Fined \$15.00 and had confiscated from him 7½ bbls. oysters.
38	Melvin McLean.....	Fishing for oysters in close season.....	Hardwicke.....	Fined \$15.00.
39	Allen Gegan.....	Fishing for oysters in close season.....	Hardwicke.....	Fined \$15.00.

40	Joseph Washburn.....	Neglecting to remove salmon net pickets.....	Loggieville.....	Fined \$1.00.
41	Amettee Jones.....	Having in possession illegally packed lobsters.....	Island River.....	Sentence deferred.
42	William Daley.....	Failing to remove salmon pickets in close season.....	Loggieville.....	Fined \$1.00.
43	Alex. Harding.....	Fishing for salmon in close season.....	Tabusintac River.....	Fined \$5.00.
44	Allan F. Loggie.....	Fishing for salmon with small mesh net.....	Loggieville.....	Fined \$10.00 and costs. Allowed to stand.
45	Alexander Fenton.....	Failing to remove salmon pickets at close of season.....	Chatham.....	Fined \$1.00 and costs.
46	A. G. Wallace.....	Violation of weekly close season for salmon fishing.....	Upper Charlotte Co.....	Fined \$5.00 and costs.
47	D. G. Stewart.....	Violation of weekly close season for salmon fishing.....	Dalhousie.....	Fined \$5.00 and costs.
48	Robert McMillan.....	Violation of weekly close season for salmon fishing.....	Upper Charlotte Co.....	Fined \$5.00 and costs.
49	Walter Anderson.....	Violation of weekly close season for salmon fishing.....	New Mills.....	Fined \$5.00 and costs.
50	Ross Johnston.....	Interfering with an officer.....	Tabusintac River.....	Not guilty.
51	Ross Johnston.....	Fishing for salmon in close season.....	Tabusintac River.....	Not guilty.
52	Mildred Herbert.....	Fishing for salmon in close season.....	Tabusintac River.....	Not guilty.
53	Richard Murphy.....	Interfering with an officer.....	Tabusintac River.....	Not guilty.
54	Richard Murphy.....	Fishing for salmon in close season.....	Tabusintac River.....	Fined \$50.00 and costs.
55	Richard Murphy.....	Fishing for lobsters in close season.....	Richibucto Cape.....	Fined \$5.00 and costs.
56	Nicholas Thibodeau.....	Fishing for lobsters in close season.....	Richibucto Cape.....	Fined \$5.00 and costs.
57	Amedee Thibodeau.....	Fishing for lobsters in close season.....	Richibucto Cape.....	Fined \$5.00 and costs.
58	Adelard Caisie.....	Fishing for salmon in close season.....	Tabusintac River.....	Fined \$25.00.
59	Leonard Robertson.....	Fishing for salmon in close season.....	Tabusintac River.....	Fined \$25.00.
60	Mike Robertson.....	Fishing for smelts without a license.....	Tabusintac River.....	Fined \$25.00 and costs.
61	Clay Williston.....	Fishing for smelts without a license.....	Miramichi River.....	Fined \$25.00 and costs.
62	Wilfrid Ferguson.....	Buying bag-net smelts before opening date.....	East Point.....	Fined \$15.00 and costs.
63	D. W. Hoegg and Co. per H. J. Gilman.....	Violating weekly close season for salmon fishing.....	Upper Charlotte Co.....	Fined \$10.00.

## NEW BRUNSWICK—DISTRICT No. 3—Inspector, H. E. HARRISON

1	C. H. Wiggins.....	Illegal shad fishing.....	Washademoak Lake.....	Fined \$10.00 and costs and had confiscated from him 1 shad net.
2	Wilfrid Siderquest.....	Water pollution.....	Baird's Brook.....	Fined \$20.00 and costs.
3	Lee McCutcheon.....	Illegal shad fishing.....	Washademoak Lake.....	Fined \$10.00 and costs and had confiscated 1 shad net.
4	Gilbert Robinson.....	Setting net in non-tidal water without a permit.....	Kennebecasis River.....	Fined \$20.00 and costs and had confiscated from him 1 old net.
5	Vincent Copp.....	Fishing without permit and with illegal materials.....	Northwest Miramichi River.....	Action withdrawn on payment of costs by defendant. Had confiscated illegal wire material, 3 grilse, 1 trout.
6	Burton Norton.....	Fishing without permit and with illegal materials.....	Northwest Miramichi River.....	Action withdrawn on payment of costs by defendant.
7	Kenneth Henderson.....	Fishing for salmon with a net over length.....	St. John River.....	Fined \$25.00 and costs. Had confiscated from him 1 salmon net and costs and some wire netting.
8	Wilfrid Verett.....	Water pollution.....	Ledge Stream.....	Fined \$20.00. Suspended sentence.
9	James Kinrade.....	Fishing for shad during closed season.....	Washademoak Lake.....	Fined \$10.00 and costs.
10	Thomas Gill.....	Water pollution.....	Barnaby River.....	Fined \$10.00 and costs.
11	John Guest, Sr.....	Water pollution.....	Monquart Stream.....	Fined \$20.00.

RETURN showing the Details of Prosecutions for Offences against the Fisheries Act during the Fiscal Year 1927-28—*Continued*

NEW BRUNSWICK—DISTRICT 3—*Concluded*

Pros. No.	Name of Offender	Name of Offence	Place of Offence	Result of Prosecution
12	A. G. Sloat.....	Fishing with a net for salmon without a license.....	St. John River.....	Fined \$20.00 and costs. Had confiscated 1 salmon net.
13	James Robinson.....	Angling for salmon with bait.....	Kennebecasis River.....	Fined \$10.00 and costs and had confiscated from him 1 bamboo rod and line.
14	Harvey Robinson.....	Angling for salmon with bait.....	Kennebecasis River.....	Fined \$10.00 and costs. Had confiscated from him 1 bamboo rod and line.
15	J. J. Jackson.....	Assisting at angling for salmon with bait and gaff.....	Kennebecasis River.....	Fined \$10.00 and costs. Had confiscated from him 1 fish gaff.
16	Paul Plourde.....	Water pollution.....	Four Mile Brook and Little River.....	Fined \$20.00 and costs.
17	Sanford Stewart.....	Having illegally caught salmon in his possession.....	Millerton.....	Fined \$5.00 and costs and had confiscated from him 228 pounds salmon and 1 Ford automobile.
18	James Minor.....	Illegally fishing for salmon.....	Southwest Miramichi River.....	Fined \$20.00 and costs. Had confiscated from him 150 feet woven wire.
19	Alexander Pratt.....	Illegally fishing for salmon.....	Southwest Miramichi River.....	Fined \$20.00 and costs. Suspended.
20	Lloyd Gilks.....	Having in possession illegally caught salmon.....	Blackville.....	Had confiscated from him woven wire. Fined \$20.00 and costs. Suspended.
21	Elvin Holmes.....	Having in possession illegally caught salmon.....	Blackville.....	Had confiscated from him 2 salmon and 1 salmon net. Suspended.
22A	Peter Harris.....	Fishing for salmon with a net without a permit.....	Miramichi River.....	Fined \$20.00 and costs. Suspended.
23	Sellars Fairley.....	Killing salmon with spear and torch.....	Southwest Miramichi River.....	Fined \$10.00 and costs. Had confiscated 14 salmon, 1 fire basket, 2 spears, 1 canoe.
24	Howard Fairley.....	Killing salmon with spear and torch.....	Southwest Miramichi River.....	Fined \$10.00 and costs.
25	Leo Solomon.....	Killing salmon with spear and torch.....	St. John River.....	Fined \$5.00 and costs.
26	Frank Gilmore.....	Drifting with net for salmon.....	St. John River.....	Fined \$10.00 and costs.
PRINCE EDWARD ISLAND—Inspector, S. T. GALLANT				
1	Peter Matthews.....	Having lobsters in his possession in close season.....	Alberton.....	Fined \$100.00 and costs. Given one month to pay during which time the man died.
2	Alfred Ahearn.....	Having lobsters in his possession in close season.....	Alberton.....	Fined \$75.00 and costs.
3	Chas. Delory.....	Having lobsters in his possession in close season.....	Seal River.....	Fined \$20.00 and confiscation of 1 barrel of oysters.

4	Samuel Fraser.....	Having lobsters in his possession in close season.....	Alberton.....	Fined \$50.00 and costs or 30 days in jail and confiscation of 1 case of lobsters.
5	Joseph A. Clement.....	Having lobsters in possession in close season.....	Roseville.....	Fined \$5.00 and costs or 10 days in jail. Suspended sentence. Confiscation of 4 cases of lobsters.
6	Joseph Clements, Sr.....	Having lobsters in possession in close season.....	Little Miminegash.....	Fined \$25.00 and costs or 30 days in jail. Placed in jail.
7	Adam Jones.....	Having lobsters in possession in close season.....	Little Miminegash.....	Fined \$25.00 and costs or 30 days in jail. Placed in jail.
8	Geo. E. Jones.....	Having lobsters in possession in close season.....	Little Miminegash.....	Fined \$25.00 and costs or 30 days in jail. Placed in jail.
9	John Jones, Sr.....	Having lobsters in possession in close season.....	Little Miminegash.....	Fined \$25.00 and costs or 30 days in jail.
10	John Clements.....	Having lobsters in possession in close season.....	Little Miminegash.....	Fined \$25.00 and costs or 30 days in jail.
11	Fred Clements.....	Having lobsters in possession in close season.....	Little Miminegash.....	Fined \$25.00 and costs or 30 days in jail. Sent to jail.
12	William Jones.....	Having lobsters in possession in close season.....	Little Miminegash.....	Fined \$25.00 and costs or 30 days in jail.
13	Albert Jones.....	Having lobsters in possession in close season.....	Little Miminegash.....	Fined \$25.00 and costs or 30 days in jail.
14	Frank Jones.....	Having lobsters in possession in close season.....	Little Miminegash.....	Fined \$25.00 and costs or 30 days in jail.
15	Fred Jones.....	Having lobsters in possession in close season.....	Little Miminegash.....	Fined \$25.00 and costs or 30 days in jail.
16	C. F. Morrissey.....	Having lobsters in his possession in close season.....	Black Marsh.....	Fined \$60.00 and costs or 60 days in jail and had confiscated from him 40 lbs. of lobsters.
17	Michael Francis.....	Obstructing an officer in discharge of duties.....	Waters-at-Lennox Island.....	Twenty days in jail. Suspended sentence.
18	Edward Clements.....	Having lobsters in possession in close season.....	Little Miminegash.....	Fined \$25.00 and costs or 30 days in jail.
19	Alfred Genoit, or Jennings.....	Having lobsters in possession in close season.....	Alberton.....	Fined \$150.00 and costs or 2 months in jail.
20	Geo. Bennett.....	Having lobsters in possession in close season.....	Alberton.....	Fined \$25.00 and costs.
21	Howard Clark.....	Having lobsters in possession in close season.....	Alberton.....	Fined \$65.00.
22	Joseph Gaudet.....	Having lobsters in possession in close season.....	Alberton.....	Fined \$25.00 and costs.
23	Peter Gavin.....	Having lobsters in possession in close season.....	Alberton.....	Fined \$5.00 and costs.

MANTOBA—Inspector, J. B. SKAFFASSON

1	J. Weisbrod.....	Fishing without permit (violating Sec. 1, F.R.)....	Whitemud River, Gladstone.....	Fined \$5.00 and costs and confiscated from him 1 dip-net.
2	Cyril Timms.....	Fishing without permit (violating Sec. 1, F.R.)....	Whitemud River, Gladstone.....	Suspended sentence. Had confiscated from him 1 dip-net.
3	W. Garth.....	Fishing without permit (violating Sec. 1, F.R.)....	Plum Creek, near Oak Lake.....	Fined \$1.00 and costs. Had confiscated 1 hay fork.
4	L. Wanlin.....	Fishing without permit (violating Sec. 1, F.R.)....	Plum Creek, near Oak Lake.....	Fined \$1.00 and costs. Had confiscated 1 hay fork.
5	S. Sepron.....	Having in possession pickerel in close season, violating Sec. 29, F.R.....	Sandy Hook.....	Fined \$15.00 and had confiscated from him 15 lbs. pickerel.
6	John Alston.....	Fishing during close season, violating Sec. 29, F.R.....	Souris River, near Melita.....	Fined 50c. and costs.
7	Harold Cashin.....	Fishing during close season, violating Sec. 29, F.R.....	Souris River, near Melita.....	Fined 50c. and costs.
8	Winston Holden.....	Fishing during close season, violating Sec. 29, F.R.....	Souris River, near Melita.....	Fined 50c. and costs.
9	Robert McLannet.....	Fishing during close season, violating Sec. 29, F.R.....	Souris River, near Melita.....	Fined 50c. and costs.

## RETURN showing the Details of Prosecutions for Offences against the Fisheries Act during the Fiscal Year 1927-28—Continued

## MANITOBA—Concluded

Pros. No.	Name of Offender	Nature of Offence	Place of Offence	Result of Prosecution
10	Albert H. Le Vasseur.....	Having sturgeon in possession during close season, violating Sec. 30, F.R.	Lac du Bonnet.....	Fined \$10.00 and costs and in default 30 days in jail. Had confiscated from him 1 sturgeon and 2 jackfish.
11	Mrs. Rosie Katorin.....	Illegal possession of pickerel in close season, violating Sec. 29, F.A.	448 Magnus Ave., Winnipeg.....	Fined \$20.00 and had confiscated 16 lbs. pickerel.
12	D. Kessler.....	Illegal possession of pickerel in close season.....	448 Magnus Ave., Winnipeg.....	Fined \$20.00 and had confiscated 8 lbs. pickerel.
13	Mrs. L. Silverberg.....	Illegal possession of pickerel in close season.....	448 Magnus Ave., Winnipeg.....	Case dismissed. Had confiscated 2 lbs. pickerel.
14	Stephen Sigurdson.....	Illegal fishing for sturgeon, violating Sec. 30 d and I, F.R.	Lake Winnipeg, vicinity of Pigeon Point.	Fined \$10.00 and costs or 30 days in jail, and had confiscated from him 1 sturgeon net 10" mesh.
15	Stephen Finnon.....	Using illegal mesh nets.....	Vicinity of Blackbear Island.....	Fined \$15.00 or 15 days hard labour, and had confiscated from him 5 gill-nets.
16	Hjortur Goodman.....	Illegal fishing for sturgeon, violating Sec. 30 d and I, F.R.	Lake Winnipeg, vicinity of Pigeon Point.	Fined \$10.00 and costs or 30 days in jail.
17	Andrew Finnbogason.....	Illegal fishing for sturgeon, violating Sec. 30 d and I, F.R.	Lake Winnipeg, vicinity of Pigeon Point.	Fined \$10.00 and costs or 30 days in jail.
18	John Anthony.....	Using illegal mesh nets.....	Near Sandy Bar.....	Fined \$10.00 or 10 days hard labour, and had confiscated 3 gill-nets, 1 skiff.
19	Francis Mackwab.....	Fishing without license.....	Vicinity of Berens River.....	Fined \$20.00 and costs or 30 days hard labour.
20	Allan Jonoson.....	Illegal mesh nets contrary to Sec. 11 (b), F.R.....	Vicinity of Clements Point.....	Fined \$5.00 and had confiscated from him 3 gill-nets.
21	Stephen Stephanson.....	Using illegal mesh nets.....	Vicinity of West Doghead.....	Fined \$1.00 and costs and had confiscated 6 gill-nets.
22	Bjarni Olafson.....	Using illegal mesh nets.....	3 miles north of Mitchell's Camp.	Fined \$1.00 and costs and confiscated 8 gill-nets.
23	J. Sawanash.....	Fishing sturgeon without license, violating Sec. 1, F.R.	Lake Winnipeg, vicinity Berens River.	Fined \$20.00 and costs.
24	Ed. O'Hara.....	Fishing illegal mesh sturgeon nets, violating Sec. 30 F.R.	Pigeon River, vicinity Lake Winnipeg.	Case dismissed.
25	Barney O'Hara.....	Fishing illegal mesh sturgeon nets, violating Sec. 30 F.R.	Pigeon River, vicinity Lake Winnipeg.	Case dismissed.
26	Peter Karklin.....	Fishing in the Winnipeg River, violating Sub-sec. E of Sec. 30, F.R.	Winnipeg River, Lac du Bonnet, above Pine Falls.	Fined \$25.00 and costs or one month in jail and had confiscated from him 538 lbs. sturgeon, 6½ lbs. caviar, 1 yawl, 1 Johnson 2-cylinder outboard gas engine.
27	Helgi Einarson.....	Fishing with illegal mesh nets, violating Sec. 14, Sub-sec. 4, F.R.	Lake Winnipeg, Berens River.	Fined \$20.00 and costs and had confiscated from him 10 sturgeon gill-nets.

28	W. A. Lund.....	Using illegal mesh nets violating Sec. 14, Sub-sec. 4, F.R.	Pigeon River.....	Fined \$20.00 and costs and had confiscated from him 7 sturgeon gill-nets.
29	Oli Johnson.....	Using illegal size mesh nets.....	Vicinity of Moose Island, Fisher Bay.....	Fined \$1.00 and had confiscated from him 4 gill-nets.
30	Barney Anderson.....	Using illegal size mesh nets.....	Vicinity of Moose Island, Fisher Bay.....	Fined \$1.00 and had confiscated from him 4 gill-nets.
31	John Olafson.....	Using illegal size mesh nets.....	Vicinity of Moose Island, Fisher Bay.....	Fined \$1.00 and had confiscated from him 4 gill-nets.
32	John Murdock.....	Using illegal size mesh nets.....	Vicinity of Moose Island, Fisher Bay.....	Fined \$10.00 or 15 days in jail and had confiscated 2 gill-nets with corks.
33	Alex Frederickson.....	Causing to be used one 4 1/2" mesh net.....	Clear Water Lake.....	Fined \$25.00 and had confiscated from him 1 gill-net, 80 lbs. whitefish, 7 trout.
34	D. G. McDonald.....	Fishing 4 1/2" mesh net, contrary to Sec. 13, Sub-sec. 4B, F.R.	Herb Lake.....	Fined \$20.00 and costs and had confiscated from him 30 boxes of fish, 19 gill-nets.
35	Alfred Ateah.....	Fishing illegal mesh nets.....	Travers Bay, East of Victoria Beach.....	Fined \$2.00 and had confiscated from him 5 gill-nets.
36	Sandy Campbell.....	Obstructing passage of fish, Sec. 41, F. Act.....	Waterhen River, vicinity of Lake Winnipegosis.....	Fined \$15.00 and costs.
37	P. B. McLaren.....	Violation of Sec. 29, Fishery Act.....	Rock Lake.....	Fined costs of court.
38	Duncan Caughlin.....	Violation of Sec. 29, Fishery Act.....	Rock Lake.....	Fined \$1.00 and costs.
39	A. L. Wheeler.....	Violation of Sec. 29, Fishery Act.....	Rock Lake.....	Acquitted.
40	Geo. Avery.....	Violation of Sec. 29, Fishery Act.....	Rock Lake.....	Fined costs of court.
41	Archib. Marrion.....	Obstructing passage of fish, Fishery Act 41.....	Waterhen River, vicinity of Lake Winnipegosis.....	Fined \$10.00 and costs and had confiscated from him 4 nets.
42	Barney Isfeld.....	Using illegal mesh nets (violating Sec. 9, Sub-sec. D).....	Sandy Bay, N.E. of Amaranth.....	Fined \$20.00 and had confiscated from him 20 gill-nets.
43	Eric Isfeld.....	Using illegal mesh nets (violating Sec. 9, Sub-sec. D).....	Sandy Bay, N.E. of Amaranth.....	Fined \$10.00 and costs and had confiscated from him 4 gill-nets.
44	Barney Isfeld.....	Using illegal mesh nets (violating Sec. 9, Sub-sec. D).....	Sandy Bay, N.E. of Amaranth.....	Fined \$50.00 and costs and had confiscated from him 25 gill-nets.

## SASKATCHEWAN.—Inspector, G. C. McDONALD

1	Tony Luitz.....	Fishing in close season contrary to Sec. 21 of the Regulations.....	Near Valhalla Island, Long Lake.....	Fined \$1.00 or 7 days in jail.
2	Philip Schropp.....	Fishing in close season contrary to Sec. 21 of the Regulations.....	Near Valhalla Island, Long Lake.....	Fined \$1.00 or 7 days in jail.
3	Philip Selinger.....	Fishing in close season contrary to Sec. 21 of the Regulations.....	Near Valhalla Island, Long Lake.....	Fined \$1.00 or 7 days in jail.
4	Mike Burkart.....	Fishing in close season, contrary to Sec. 21 of the Regulations.....	Near Valhalla Island, Long Lake.....	Fined \$1.00 or 7 days in jail.
5	Leo Selinger.....	Fishing in close season, contrary to Sec. 21 of the Regulations.....	Near Valhalla Island, Long Lake.....	Fined \$1.00 or 7 days in jail.
6	Chas. Ell.....	Fishing in close season, contrary to Sec. 21 of the Regulations.....	Near Valhalla Island, Long Lake.....	Fined \$1.00 or 7 days in jail.
7	Frank Thomas.....	Fishing in close season, contrary to Sec. 21 of the Regulations.....	Near Valhalla Island, Long Lake.....	Fined \$1.00 or 7 days in jail.

RETURN showing the Details of Prosecutions for Offences against the Fisheries Act during the Fiscal Year 1927-28—Continued

SASKATCHEWAN—Concluded

Prosi. No.	Name of Offender	Nature of Offence	Place of Offence	Result of Prosecution
8	Geo. Schropp.....	Fishing in close season, contrary to Sec. 21 of the Regulations	Near Valhalla Island, Long Lake	Fined \$1.00 or 7 days in jail.
9	Bill Lozinsky.....	Having in possession pike contrary to Sec. 29 of F.R. Mer.	Sec. 7, Tp. 29, Rge. 4, W. 2nd Mer.	Fined \$20.00 or 30 days in jail, and had confiscated 1 pike partly cooked.
10	Gus Ivers.....	Having in possession pike contrary to Sec. 29 of the Fishery Regs.	Sec. 25, Tp. 33, Rge. 12, W. of 2nd Mer.	Fined \$4.00 and costs and had conf. from him 1 pike.
11	W. Lackmaull.....	Having in possession pike contrary to Sec. 29 of the Fishery Regs.	Sec. 12, Tp. 29, Rge. 5, W. of 2nd Mer.	Fined \$10.00 and costs and conf. from him 1 pike.
12	M. Spichen.....	Having in possession pike contrary to Sec. 29 of the Fishery Regs.	Sec. 6, Tp. 29, Rge. 4, W. of 2nd Mer.	Fined \$10.00 and costs and had conf. from him 1 pickerel.
13	Mike Secundiak.....	Having in possession 1 pike, 1 pickerel, contrary to Sec. 29, Fish. Regs.	Sec. 34, Tp. 30, Rge. 6, W. of 2nd Mer.	Fined \$5.00 and costs and conf. from him 1 pickerel, 1 pike.
14	Jan Koawetz.....	Having in his possession pike contrary to Sec. 29, F. Regs.	Sec. 24, Tp. 30, Rge. 6, W. of 2nd Mer.	Fined \$5.00 and costs.
15	Metro Secundiak.....	Having pickerel in his possession contrary to Sec. 29, Fish. Regs.	Sec. 24, Tp. 30, Rge. 6, W. of 2nd Mer.	Fined \$5.00 and costs.
16	Steve Krawetz.....	Having in his possession pike contrary to Sec. 29 of the Fish. Regs.	Sec. 24, Tp. 30, Rge. 6, W. of 2nd Mer.	Fined \$1.00 and costs.
17	Henry Yeak.....	Using dip-net without license contrary to Sec. 1, Fish. Regs.	Souris River, Weyburn.....	Fined \$5.00 and costs and had conf. from him 1 dip-net.
18	Ludwig-Bohn.....	Using dip-net without license contrary to Sec. 1, Fish. Regs.	Souris River, Weyburn.....	Fined \$5.00 and costs and had conf. from him 1 dip-net.
19	Chas. Shoulak.....	Using dip-net without license contrary to Sec. 1, Fish. Regs.	Souris River, Weyburn.....	Fined \$5.00 and costs and had conf. from him 1 dip-net.
20	Stephen Kohot.....	Using dip-net without license contrary to Sec. 1, Fish. Reg.	Souris River, Weyburn.....	Fined \$5.00 and costs and had conf. from him 1 dip-net.
21	Albert Dow.....	Using dip-net without license contrary to Sec. 1, Fish. Regs.	Souris River, Weyburn.....	Fined \$5.00 and costs and had conf. from him 1 dip-net.
22	Geo. Reddick.....	Fishing in closed season contrary to Sec. 21 of the Regs.	Near Regina Beach.....	Fined \$3.00 and had conf. from him 10 lbs pickerel.
23	H. Hildson.....	Fishing in closed season, contrary to Sec. 21 of the Fish. Regs.	Regina Beach.....	Fined \$3.00.
24	B. Robertson.....	Fishing in closed season, contrary to Sec. 21 of the Fish. Regs.	Regina-Beach.....	Fined \$3.00.
25	B. H. Wilson.....	Fishing in closed season, contrary to Sec. 21 of the Fish. Regs.	Regina-Beach.....	Fined \$3.00.
26	Wm. Stephens.....	Fishing in closed season, contrary to Sec. 21 of the Fish. Regs.	Swift Current Creek.....	Fined \$2.00 and costs.
27	Joe English.....	Fishing in closed season contrary to Sec. 21 of the Fish. Regs.	Swift Current Creek.....	Fined \$5.00 and costs.
28	James Wood.....	Fishing in closed season, contrary to Sec. 21 of the Fish. Regs.	Swift Current Creek.....	Fined \$10.00 and costs.

29	Joe Gorry.....	Fishing in closed season, contrary to Sec. 21 of the Fish. Regs.	Swift Current Creek.....	Fined \$5.00 and costs.
30	Ben Princeston.....	Fishing in closed season, contrary to Sec. 21 of the Fish. Regs.	Long Lake near Vale-port.....	Fined \$10.00 and costs.
31	Geo. Barre or Joe Barr.....	Fishing in closed season, contrary to Sec. 21 of the Fish. Regs.	Long Lake near Vale-port.....	Fined \$10.00 and costs.
32	Joe Moist or Most.....	Fishing in closed season, contrary to Sec. 21 of the Fish. Regs.	Long Lake near Vale-port.....	Fined \$10.00 and costs.
33	Joe Zerr.....	Fishing in closed season, contrary to Sec. 21 of the Fish. Regs.	Long Lake near Vale-port.....	Fined \$10.00 and costs.
34	J. Wood.....	Fishing in closed season, contrary to Sec. 21 of the Fish. Regs.	Long Lake near Vale-port.....	Fined \$10.00 and costs.
35	Alex Lemaire.....	Fishing with nets of less mesh than 5½" stretched measure, cont. to Sec. 17 of the Spec. Regs.	Lac Pelletier.....	Fined \$10.00 and costs and had conf. from him 1-20 ft Seine net and 20 lbs. white-fish, 2 lbs. of pike.
36	Alex Lemaire.....	Permitting nets not numbered, nor marked, contrary to Sec. 15 of the Spec. Fish. Regs.	Lac Pelletier.....	Fined \$2.00 and costs and had conf. from him 50 yds. gill-net.
37	David Klassen.....	Fishing with illegal apparatus viz.: wire traps, contrary to Sec. 27 of the Spec. Fish. Regs.	Swift Current Creek.....	Fined \$5.00 and costs and conf. from him 1 box of wire traps.
38	Addie Klassen.....	Fishing with illegal apparatus viz.: wire traps, contrary to Sec. 27 of the Spec. Fish. Regs.	Swift Current Creek.....	Fined \$5.00 and costs and conf. from him 1 box of wire traps.
39	Jack Friesen.....	Fishing with illegal apparatus viz.: wire traps, contrary to Sec. 27 of the Spec. Fish. Regs.	Swift Current Creek.....	Fined \$5.00 and costs and conf. from him 1 box of wire traps.
40	Henry Poitras.....	Using snare contrary to Sec. 27, Fish Regs.	Katapew Dam, N.W. ¼ Sec. 27, Tp. 19, Rge. 12, W. of 2nd Mer.	Fined \$1.00 and costs and had conf. 1 snare.
41	F. M. Grier.....	Using illegal mesh net, contrary to Sub-Sec. 1 of Sec. 11, Fish Regs.	Round Lake.....	Fined \$5.00 and costs and had conf. 1 gill-net.
42	Matti Stom.....	Having in possession fish contrary to Sec. 29, Fish Regs.	Percival, Tp. 24, Sec. 16, Rge. 4, W. of 2nd Mer.	Fined \$20.00 and cost and had conf. 7 gill-nets and 150 lbs. tullibee.
43	Roger Nabiss.....	Failing to number net as required, Sec. 3, Fish Regs.	Pasqua Lake.....	Fined \$1.00 and costs and had conf. 25 lbs. tullibee, 1 gill-net.
44	Pegan.....	Using illegal mesh net contrary to sub-sec. 1 of Sec. 11.	Pasqua Lake.....	Fined \$1.00 and costs and had conf from him 5 yds. gill-net.
45	Alex Keynotch.....	Fishing without license or permit contrary to Sec. 2, Para 1 of the Regs.	Whitefish Lake.....	Fined 50c. and costs.
46	George Stewart.....	Fishing without license or permit contrary to Sec. 2, Para 1 of the Regs.	Whitefish Lake.....	Fined 50c. and costs.
47	Geo. Morin.....	Fishing without license or permit contrary to Sec. 2, Para 1 of the Regs.	Whitefish Lake.....	Fined 50c. and costs.
48	Thomas Whitefish.....	Fishing without license or permit contrary to Sec. 2, Para 1 of the Regs.	Whitefish Lake.....	Fined 50c. and costs.
49	Ernest Joseph.....	Fishing without license or permit contrary to Sec. 2, Para 1 of the Regs.	Long Lake.....	Fined 50c. and costs.
50	Buster Bear.....	Fishing without license or permit contrary to Sec. 2, Para 1 of the Regs.	Long Lake.....	Fined 50c. and costs.
51	Geo. Whitefish.....	Fishing without license or permit contrary to Sec. 2, Para 1 of the Regs.	Long Lake.....	Fined 50c. and costs.
52	Thor Johnson.....	Fishing during close season.....	Ile a la Crosse Lake.....	Fined \$50 and had con. from him 220 lbs. whitefish and 180 lbs. pike, and 3 gill-nets.

RETURN showing the Details of Prosecutions for Offences against the Fisheries Act during the Fiscal Year 1927-28—Continued

ALBERTA—Inspector R. T. RORD

Pros. No.	Name of Offender	Nature of Offence	Place of Offence	Result of Prosecution
1	Rosedale Mining Co.	Pollution of a stream by permitting mine refuse to enter.	The Red Deer River.	Fined \$10.00 and costs.
2	Star Mining Co.	Pollution of a stream by permitting mine refuse to enter.	The Red Deer River.	Fined \$10.00 and costs.
3	Edward Clark.	Fishing without a license.	Lesser Slave Lake.	Fined \$15.00.
4	Frederick Bordynuk.	Fishing in the close season with a net of illegal mesh.	Red Deer River, near Newcastle.	Fined \$5.00 and costs and had conf. from him 1 gill-net.
5	Paul Kwiczak.	Fishing in the close season with a net of illegal mesh.	Red Deer River, near Newcastle.	Fined \$5.00 and costs and had conf. from him 1 gill-net.
6	Steve Serna.	Fishing without license.	Jackfish Lake, near Bellis.	Fined \$3.00.
7	Fete Warawuk.	Fishing without license.	Jackfish Lake, near Bellis.	Fined \$3.00.
8	Frederick Pekes.	Fishing with a net in prohibited waters without a license.	Burntwood Lake.	Fined \$25.00 and costs and had conf. from him 1 gill-net.
9	Cuddy Lumber Co.	Depositing sawdust and mill rubbish.	Athabasca River.	Fined \$10.00 and costs.
10	Lars Peterson.	Fishing with light contrary to Sec. 29, F.R.	Sylvan Lake.	Fined \$1.00 and costs.
11	John Smith.	Fishing with light contrary to Sec. 29, F.R.	Sylvan Lake.	Fined \$1.00 and costs.
12	Alfred Gulbe.	Fishing with a net in prohibited waters without a license.	Burntwood Lake.	Fined \$10.00 and costs, had conf. from him 1 gill-net.
13	Rudolph Pekse.	Fishing with a net in prohibited waters without a license.	Burntwood Lake.	Suspended sentence on payment of cost of court by def.
14	W. A. Vaughn.	Having trout under 9" contrary to Sec. 34, Sp. Fish. Regs.	South Fork off Old Man River	Fined \$10.00 and costs and had conf. 1 greenheart rod, 7 rainbow trout.
15	Union Packing Co.	Pollution of stream by putting manure from the yard into it.	Nose Creek near Calgary.	Fined \$20.00 and costs.
16	R. A. McIvor.	Killing fish under the legal size.	Elbow River near Bragg Creek	Fined \$5.00. Had conf. from him 1 fishing rod.
17	J. Loftus.	Using net contrary to Sec. 1, Fish. Regs.	Belly River, Lethbridge.	Fined \$2.00 and costs and had conf. from him 1 net and 6 coarse fish.
18	M. Swedish.	Using net contrary to Sec. 1, Fish. Regs.	Belly River, Lethbridge.	Fined \$2.00 and costs and had conf. from him 1 net and 6 coarse fish.
19	Edgar Duckett.	Fishing with small mesh net contrary to Para. 1, Sec. 11 of Spec. Fish Reg.	Moose Lake.	Fined \$5.00 and costs and had conf. from him 1 net and 6 coarse fish.
20	Ivan McNeil.	Fishing with small mesh nets contrary to Para. 1, Sec. 11, Spec. Fish. Regs.	Moose Lake.	Fined \$5.00 and costs and had conf. from him 3 nets.
21	Wm. Hislop.	Fishing with small mesh nets contrary to Para. 1, Sec. 11 Spec. Fish. Regs.	Moose Lake.	Fined \$5.00 and costs and had conf. 1 gill-net.
22	F. B. Shepersky.	Assisting angler to fish without permit contrary to Sec. 32 (a) Spec. Regs.	Moose Lake.	Fined \$5.00 and costs and had conf. 1 gill-net.
23	B. Salander.	Fishing without angling permit.	Cold Lake.	Fined \$10.00 and costs.

24	R. Chartier.....	Selling fish under Domestic Lic. contrary to Sec. 2, Cold Lake.	Case dismissed.
25	O. J. Woods.....	Para. 8 (b). Angling without permit contrary to Sec. 1—A. Fish. Regs.	Fined \$5.00 and costs and had conf. from him 15 trout.
26	Fred Perkins.....	Having undersized trout contrary to Sec. 2 A. Fish. Regs.	Fined \$5.00 and cost. and had conf. from him 13 small trout and 11 over 9."
27	Joseph Elliot.....	Angling in a closed stream.....	Fined \$50.00 and costs. Suspended sentence condition he leaves place.
28	Jack Miller.....	Fishing in a closed lake contrary to Sub-sec. 9 of Sec. 14, Spec. Regs.	Fined \$5.00 and costs.
29	J. Whiteley.....	Killing fish under legal size.....	Fined \$3.00 and confiscation of 1 fishing rod and tackle.
30	Alvin O. Rich.....	Angling without a permit contrary to Sec. 1, para. (b) of Alta. Regs.	Fined \$5.00 and costs and confiscation of 1 rod and leader.
31	John Bodik.....	Using a net for coarse fish with 2½-inch mesh net contrary to Sec. 11, para. 3, Spec. Fish. Regs.	Had confiscated from him 1 net and costs of court.
32	Edward Campbell.....	Angling without a permit, contrary to Sec. 32 of Spec. Fish. Regs.	Fined \$5.00 and costs and had confiscated from him 1 binder whip used as rod.
33	Fay W. Liddle.....	Angling without a permit, contrary to Sec. 32 of Spec. Fish. Regs.	Fined \$5.00 and costs and had confiscated from him 1 rod.
34	Edwin Smith.....	Angling without a permit, contrary to Sec. 32 of Spec. Fish. Regs.	Fined \$5.00 and costs and had confiscated from him 3-jointed steel rod.
35	Louis Lavelle.....	Fishing in close season.....	Not guilty. Had confiscated from him 2 gill-nets. Returned to defendant.
36	Geo. Bourque.....	Fishing in close season.....	Not guilty. Had confiscated from him 2 gill-nets. Returned to defendant.
37	Sylvestre Bourque.....	Fishing in close season.....	Not guilty. Had confiscated from him 3 gill-nets. Returned to defendant.
38	Louis Bouvier.....	Fishing in close season.....	Not guilty. Had confiscated from him 3 gill-nets. Returned to defendant.
39	Alphonse Bourque.....	Fishing in close season.....	Not guilty. Had confiscated from him 3 gill-nets. Returned to defendant.
40	Narcisse Ladonceanu.....	Fishing during close season.....	Not guilty. Had confiscated from him 2 gill-nets. Returned to defendant.
41	Arthur Huppie.....	Fishing during close season.....	Not guilty. Had confiscated from him 2 gill-nets. Returned to defendant.
42	R. Trombly.....	Fishing during close season.....	Not guilty. Had confiscated from him 3 gill-nets. Returned to defendant.
43	Elie Crause.....	Angling without permit contrary to Sec. 1 (b) Fish. Regs.	Fined \$5.00 and costs. Had confiscated from him 1 willow pole and hook.
44	Geo. Jones.....	Angling without permit contrary to Sec. 32 (a) of Fish. Regs.	Fined \$5.00 and costs and had confiscated from him 1 bamboo pole.
45	A. Brilliant.....	Having illegal gill-net.....	Fined \$20.00 or 21 days in jail. Had confiscated from him 3 gill-nets.
46	Pat McDermett.....	Fishing with 3 illegal gill-nets.....	Fined \$20.00, no costs, one month in jail. Had confiscated from him 3 gill-nets.
47	C. R. McKenzie.....	Fishing with illegal gill-nets.....	Fined \$20.00 or one month in jail and had confiscated from him 103 pounds of fish.

RETURN showing the Details of Prosecutions for Offences against the Fisheries Act during the Fiscal Year 1927-28—Continued

ALBERTA—Concluded

Pros. No.	Name of Offender	Nature of Offence	Place of Offence	Result of Prosecution
48	J. Brillon.....	Fishing without a license.....	White Fish River.....	Fined \$25.00 and had confiscated from him fish and nets.
49	J. Brillon.....	Fishing in closed season.....	White Fish River.....	Fined \$25.00 and had confiscated from him fish and nets.
50	J. Brillon.....	Obstructing Mink Creek with wire-netting.....	Mink Creek, White Fish Lake No. 2.....	Fined \$35.00 and costs and had confiscated from him fish and nets.
51	Pat McDermott.....	Fishing in closed season.....	Whitefish River.....	Fined \$25.00.
52	Pat McDermott.....	Fishing without a license.....	Whitefish River.....	Fined \$25.00 and costs.
53	Frank O. Letie.....	Fishing in closed season.....	Mink Creek.....	Fined \$20.00.
54	Frank O. Letie.....	Fishing without a license.....	Mink Creek.....	Fined \$20.00 and costs.
55	Joe McDermott.....	Fishing in closed season.....	Whitefish River.....	Fined \$20.00.
56	Joe McDermott.....	Fishing without a license.....	Whitefish River.....	Fined \$20.00 and costs.
57	David Bottle.....	Fishing in closed season.....	Mink Creek.....	Fined \$20.00 and costs.
58	Peter Shaw.....	Fishing without a license.....	Mink River.....	Fined \$20.00 and costs.
59	Peter Shaw.....	Fishing in closed season.....	Mink River.....	Fined \$20.00.
60	T. Randell.....	Fishing in closed season.....	Big Whitefish Lake.....	Fined \$20.00 and had confiscated from him 1 gill-net.
61	The Rosedeer Mine.....	Pollution of stream by permitting mine refuse to enter.....	Rosebud Creek, Wayne.....	Fined \$40.00 (reduced to \$5.00) and costs.
62	Superior Grade Coal Co.....	Pollution of stream by permitting mine refuse to enter.....	Rosebud Creek, Wayne.....	Fined \$40.00 (reduced to \$1.00) and costs.
63	The Sovereign Coal Mining Co.....	Pollution of stream by permitting mine refuse to enter.....	Rosebud Creek, Wayne.....	Fined \$20.00 (reduced to \$1.00) and costs.
64	The Ideal Mine.....	Pollution of stream by permitting mine refuse to enter.....	Rosebud Creek, Wayne.....	Fined \$20.00 (reduced to \$1.00) and costs.
65	J. Bellrose, Jr.....	Fishing with illegal net.....	Snipe Lake.....	Fined \$10.00 and confiscated from him 7 gill-nets.
66	Frank Murphy.....	Fishing with illegal size mesh net.....	Lac La Biche.....	Fined \$10.00 and costs and had confiscated 1 gill-net.

BRITISH COLUMBIA—Chief Inspector Major J. A. MOTHERWELL  
DISTRICT No. 1—Inspector A. P. HALLDAY

1	H. Hewett.....	Fishing in closed areas.....	Campbell River.....	Fined \$2.50 and costs.
2	H. Hansen.....	Assisting in salmon gill-net fishing without having a license.....	Fraser River.....	Fined \$15 and costs.
3	J. C. Taylor.....	Fishing in closed areas—Little Pinantan Lake.....	Little Pinantan Lake.....	Fined \$5.
4	C. Taylor.....	Fishing in closed areas—Little Pinantan Lake.....	Little Pinantan Lake.....	Fined \$5.

5	J. F. Mobley.....	Fishing in closed areas—Little Pinantan Lake.....	Little Pinantan Lake.....	Fined \$5.
4	Niek Zavagali.....	Catching trout under 8 inches in size.....	McKay Creek.....	Fined \$10 and costs
5	G. Broder.....	Fishing in that portion of Capilano River known as "The Pool."	Capilano River.....	Fined \$5 and costs.
6	George Canary.....	(1) Capturing more trout in one day than allowed by law.	Trout Lake.....	Fined \$25 and costs.
		(2) Capturing and having in possession, trout under 8 inches in length.	Trout Lake.....	Fined \$10 and costs.
6	Lum (Chinese).....	Having undersized crabs in possession.....	Vancouver.....	Fined \$25 and costs.
7	T. Terada.....	Having in possession undersized sturgeon.....	New Westminster.....	Fined \$5.
8	Mike Ludwig.....	Spearing salmon.....	Salmon River, near Silver Creek.....	Fined \$2 and costs.
9	Irving J. Wilson.....	Spearing salmon.....	Salmon River, near Silver Creek.....	Fined \$2 and costs.
10	W. Cameron.....	Spearing salmon.....	Nicola River.....	Fined \$10. Spear and wire snare confiscated.
11	C. Ardure.....	Taking trout less than 8 inches in length and not returning same to water.	Six Mile Lake.....	Fined \$10 and fishing gear confiscated.
11	R. Goodwin.....	Non-resident fishing without permit.....	Capilano River.....	Fined \$2.50 and costs.
12	T. Deferro.....	Taking trout less than 8 inches in length and not returning same to water.	Six Mile Lakes.....	Fined \$10 and fishing gear confiscated.
12	R. Wright.....	Using salmon roe while fishing in Capilano River.....	Capilano River.....	Fined \$2.50 and costs.
13	Wm. Kennedy.....	Taking trout less than 8" in length and not returning same to water.	Six Mile Lakes.....	Fined \$10.00 and fishing gear confiscated.
13	S. B. Johnson.....	Taking and killing more than 25 trout in one day.....	Capilano River.....	Fined \$1 and costs.
14	O. Shigemoto.....	Capturing and having in possession undersized sturgeon.....	Fraser River, New Westminster.....	Fined \$1 and costs.
14	S. B. Johnson.....	Catching trout under 8" in length and not returning same to water.	Capilano River.....	Fined \$15.00 and costs. Fishing gear confiscated.
15	M. W. Regan.....	Fishing in closed area—Nicomekl River.....	Nicomekl River.....	Guilty. No fine.
16	W. S. Perkins.....	Fishing in closed area—Nicomekl River.....	Nicomekl River.....	Guilty. No fine.
17	Wong Fong.....	Having in possession undersized sturgeon.....	New Westminster.....	Fined \$10.00 and costs.
18	S. Kawade.....	Having in possession undersized sturgeon.....	Fraser Mills.....	Fined \$10.00 and costs. Rod and line confiscated.
15	George Grundy.....	Operating gill-net without licenses.....	Burrard Inlet.....	Fined \$5.00 and costs.
16	Edway Snider.....	Operating gill-net within 200 yards of mouth of Seymour River.....	Seymour River.....	Fined \$25.00 and costs. Boat and net confiscated.
17	Edway Snider.....	Operating gill-net without license.....	Seymour River.....	Fined \$25.00 and costs.
19	Thos. Moen.....	Fishing during weekly closed season.....	Fraser River.....	Fined \$15.00 and costs. Boat and gear confiscated.
20	Pete Hawtreshen.....	Catching Kokanee on their spawning grounds.....	Nine Mile Creek, West Arm Kootenay.....	Fined \$10.00 and costs.
21	Joseph Biolkowski.....	Catching Kokanee on their spawning grounds.....	Nine Mile Creek, West Arm Kootenay.....	Fined \$5.00 and costs.
22	W. J. Brown.....	Illegally fishing for Kokanee—see Sec. 21, subsection 20.....	Chute Creek.....	Fined \$10.00 and costs. Gaff and dipnet confiscated.
23	J. Robinson.....	Illegally fishing for Kokanee, see sec. 21, subsection 20, Fishery Regulations.....	Trepanier Creek.....	Fined \$1.00 and costs.
24	Ernes Roper.....	Spearing salmon.....	Campbell River dam.....	Fined \$10.00 and costs.

Return showing the Details of Prosecutions for Offences against the Fisheries Act during the Fiscal Year 1927-28—Continued

BRITISH COLUMBIA—DISTRICT No. 1—Concluded

Pros. No.	Name of Offender	Name of Offence	Place of Offence	Result of Prosecution
25	Carl Lashey.....	Stoning salmon.....	Campbell River dam.....	Fined \$10.00 and costs.
26	Geo. Fillinger.....	Attempting to gaff salmon.....	Campbell River.....	Fined \$10.00 and costs.
27	G. Yamamoto.....	Fishing in closed areas.....	Silver Creek.....	Fined \$10.00 and costs.
27 A	J. Gunderson.....	Fishing for salmon with oversized net.....	Howe Sound.....	Fined \$25.00 and costs.
28	Jimmy Charles (Indian).....	Selling fish caught under permit for food purposes only.....	White Rock.....	Fined \$15.00 and costs. Salmon confiscated.
29	Vancouver Shell Fish Co.....	Buying salmon from an Indian in contravention of Section 15.....	Vancouver.....	Case dismissed. Salmon confiscated.
29 A	P. Anderson.....	Having in possession shellfish prohibited by law.....	Barnet.....	Fined \$25.00 and cost of court.
30	John Hegeman.....	Having in possession trout during close season.....	Fish Lake.....	Fined \$25.00 and costs of court and confiscation of small keg containing 10 trout.

DISTRICT No. 2.—Inspector A. MACKIE

1	Leo Goldfish.....	Fishing for salmon with set net.....	Skeena River.....	Fined \$30.00.
2	Roy Herman.....	Fishing for salmon with set net.....	Skeena River.....	Fined \$30.00.
3	Paul Benson.....	Fishing for salmon with set net.....	Skeena River.....	Fined \$30.00.
4	Yejo J. Kaakinen.....	Fishing with gill-net above commercial boundary.....	Skeena River.....	Fined \$5.00.
5	Palo, Vaino.....	Fishing with gill-net above commercial boundary.....	Skeena River.....	Fined \$10.00.
6	Mankichi Teramoto.....	Fishing in weekly closed time.....	Skeena River.....	Fined \$15.00.
7	H. Sigurdson.....	Fishing in weekly closed time.....	Skeena River.....	Fined \$15.00.
8	Tani Shazo.....	Fishing without license.....	Skeena River.....	Fined \$15.00.
9	Heibel Kitagawa.....	Carrying greater length of net than allowed by law.....	Skeena River.....	Fined \$10.00 and 70 fath. net confiscated.
10	Mansuke Fujimoto.....	Fishing with 5 $\frac{3}{4}$ mesh net before season opened.....	Skeena River.....	Fined \$25.00.
11	Moritono Okano.....	Fishing during weekly closed season.....	Naas River.....	Fined \$10.00.
12	Gilbert Martin.....	Fishing during weekly closed season.....	Naas River.....	Fined \$10.00.
13	O. Aune.....	Fishing with set net.....	Labouchere Channel.....	Fined \$25.00 and costs.
14	H. Caspersen.....	Fishing with set net.....	Labouchere Channel.....	Fined \$25.00 and costs.
15	F. Gerlang.....	Fishing with set net.....	Labouchere Channel.....	Fined \$25.00 and costs.
16	E. Iversen.....	Fishing with set net.....	Labouchere Channel.....	Fined \$25.00 and costs.
17	Geo. Sheaves.....	Fishing with set net.....	S. Bentinck Arm.....	Dismissed.
18	T. Hamada.....	Fishing for salmon with a net without a license.....	Chatham Sound.....	Fined \$150.00 and costs. Fishing gear confiscated.
19	Y. Takaki.....	Fishing for salmon with a net without a license.....	Skeena River.....	Fined \$150.00 and costs. Fishing gear confiscated.
20	S. Kano.....	Fishing for salmon with a net without a license.....	Skeena River.....	Fined \$150.00 and costs.
21	U. Stushikura.....	Fishing for salmon with a net without a license.....	Chatham Sound.....	Fined \$150.00 and costs.
22	W. R. Campbell.....	Fishing for salmon with seine less than 125 fathoms in length.....	Shwatlans.....	Fined \$25.00 and costs.
23	D. Suzuki.....	Carrying a greater length of net than allowed by license.....	Chatham Sound.....	Fined \$150.00 and costs. 97 fathoms net confiscated.

24	James Duffy.....	Fishing with gill-net exceeding 200 fathoms.....	Smiths Inlet.....	Fined \$100.00.
25	R. MacLeod.....	Fishing with gill-net exceeding 200 fathoms.....	Smiths Inlet.....	Fined \$100.00.
26	Karasuke Kariya.....	Not carrying license on boat while fishing.....	Naas River.....	Fined \$5.00.
27	Yosokichi Sokugawa.....	Not carrying license on boat while fishing.....	Naas River.....	Fined \$5.00.
28	Denjiro Takenaka.....	Not carrying license on boat while fishing.....	Naas River.....	Fined \$5.00.
29	Kojiro Shoji.....	Not carrying license on boat while fishing.....	Naas River.....	Fined \$5.00.
30	T. Omura.....	Not carrying license on boat while fishing.....	Naas River.....	Fined \$5.00.
31	Okuzo Tsujihata.....	Not carrying license on boat while fishing.....	Naas River.....	Fined \$5.00.
32	Otomatsu Fujimoto.....	Not carrying license on boat while fishing.....	Naas River.....	Fined \$5.00.
33	Kuichi Shirakawa.....	Not carrying license while fishing.....	Naas River.....	Fined \$5.00.
34	Yasuki Shimahara.....	Using purse-seine as set net.....	Black Point, Warke Canal.....	Case dismissed.
35	Ole Skog.....	Trolling for salmon without a license.....	Tide Rip Island.....	Fined \$10.00.
36	C. F. Johnstone.....	Fishing for salmon with long net.....	Koeve River.....	Fined \$50.00; 25-fathom net confiscated.
37	James Patience.....	Fishing for salmon during weekly closed season.....	Fitzhugh Sound.....	Fined \$25.00.
38	P. Jerome.....	Fishing for salmon during weekly closed season.....	Smiths Inlet.....	Fined \$20.00.
39	John Penny.....	Fishing for salmon during weekly closed season.....	Rivers Inlet.....	Fined \$10.00.
40	Fred Barbour.....	Fishing for salmon during weekly closed season.....	Rivers Inlet.....	Fined \$10.00.
41	A. Swetabile.....	Having salmon net tied to that of H. Baardsen.....	Smiths Inlet.....	Fined \$100.00.
42	Hans Ottesen.....	Having salmon gill-net tied to that of H. Ottesen.....	Smiths Inlet.....	Fined \$100.00.
43	Helmar Baardsen.....	Fishing with salmon gill-net during weekly closed season.....	Smiths Inlet.....	Fined \$10.00.
44	J. George.....	Allowed part of salmon net inside boundaries.....	Quashella Creek.....	Fined \$25.00.
45	W. Proctor.....	Allowed part of salmon net inside boundaries.....	Quashella Creek.....	Fined \$25.00.
46	Einar Martinson.....	Gill-netting salmon during weekly closed season.....	Smiths Inlet.....	Fined \$20.00.
47	Harry McKay.....	Allowed part of salmon net inside boundaries.....	Quashella Creek.....	Fined \$10.00.
48	J. Skiegstad.....	Carrying in his boat a greater length of net than allowed by his license.....	Chatham Sound.....	Fined \$25.00 and costs; 47-fathom net confiscated.
49	J. B. Inversen.....	Carrying in his boat a greater length of net than allowed by his license.....	Chatham Sound.....	Fined \$25.00 and costs.
50	Rinsø Minato.....	Fishing for salmon with set net.....	Skeena River.....	Fined \$30.00 and costs.
51	Christian Einarson.....	Fishing for salmon during weekly closed season.....	Skeena River.....	Fined \$15.00 and costs.
52	W. J. Walker.....	Fishing for salmon with long net.....	Chatham Sound.....	Fined \$25.00 and costs.
53	R. J. Duval.....	Fishing for salmon with long net.....	Chatham Sound.....	Fined \$25.00 and costs.
54	Roger Mallory.....	Fishing for salmon during weekly closed season.....	Chatham Sound.....	Prosecution withdrawn.
55	Keikichi Izumi.....	Fishing for salmon during weekly closed season.....	Chatham Sound.....	Prosecution withdrawn.
56	Ole Osberg.....	Fishing for salmon during weekly closed season.....	Chatham Sound.....	Dismissed.
57	Arthur Johnson.....	Fishing for salmon during weekly closed season.....	Chatham Sound.....	Dismissed.
58	Rinsø Minato.....	Fishing for salmon during weekly closed season.....	Chatham Sound.....	Dismissed.
59	Kumekichi Ito.....	Casting net a few minutes before 9 p.m. Sunday.....	Chatham Sound.....	Dismissed.
60	Keikichi Izumi.....	Fishing above tidal boundaries.....	Steep Point Bay, Laredo Sound.....	Dismissed.
61	Southern Freighters, Ltd.....	Fishing above tidal boundaries.....	Steep Point Bay, Laredo Sound.....	Dismissed.
62	B. C. Fish & Packing Co., Ltd.....	Fishing above tidal boundaries.....	Quashella Creek.....	Fined \$50.00.
63	Chris Morsund.....	Salmon gill-net tied to beach.....	Rivers Inlet.....	Fined \$50.00 and net confiscated.
64	Ernest Broch.....	Fishing with salmon gill-net above boundaries.....	Rivers Inlet.....	Fined \$50.00. Unable to pay. Two months in gaol.
65	A. Backe.....	Fishing with salmon gill-net above boundaries.....	Rivers Inlet.....	Fined \$100.00. Unable to pay. Four months in gaol.
66	Jacobsen.....	Willfully resisting fishery officer in execution of duties.....	Rivers Inlet.....	
67	Jacobsen.....			

RETURN showing the Details of Prosecutions for Offences against the Fisheries Act during the Fiscal Year 1927-28—*Concluded*

BRITISH COLUMBIA—DISTRICT NO. 2—*Concluded*

Pros. No.	Name of Offender	Nature of Offence	Place of Offence	Result of Prosecution
68	E. Samson.....	Fishing for salmon with gill-net when such fishing prohibited.	Bay near Tracy, Is. Portland Inlet.	Fined \$25.00 and fishing gear confiscated.
69	One Nakamura.....	Fishing during weekly closed period.	Naas River.....	Fined \$5.00.
70	Yasugito Oliguchi.....	Fishing during weekly closed period.	Naas River.....	Fined \$5.00.
71	Tatehi Machida.....	Fishing during weekly closed period.	Naas River.....	Fined \$5.00.
72	Ed. Stanley.....	Removing fresh salmon from above tidal boundary.	Naas River.....	Dismissed.
73	Ben Self.....	Fishing for salmon without a license.	Rawlanson Anchor.....	Fined \$25.00 and 40-fathom net confiscated.
74	John Erickson.....	Fishing during weekly closed season.	Rivers Inlet.....	Fined \$25.00.
75	Gosse Packing Co., Ltd.	Fishing within boundary, Cliff River.	Dean Channel.....	Fined \$200.00 and costs.
76	Canadian Fishing Co., Ltd.	Fishing within boundary, Elcho Harbour.	Dean Channel.....	Fined \$200.00 and costs.
77	Isaac Sankey.....	Bringing fresh salmon below tidal boundary.	Khutzeymateen Inlet.....	Dismissed.
78	David Hayward.....	Bringing fresh salmon below tidal boundary.	Khutzeymateen Inlet.....	Dismissed.
79	Charles M. Ryan.....	Bringing fresh salmon below tidal boundary.	Khutzeymateen Inlet.....	Dismissed.
80	Luke Car.....	Found with seine-purse in prohibited area.	Goose Bay, Selwyn Inlet.....	Dismissed.
81	B.C. Fishing & Packing Co., Ltd.	Illegal possession of salmon.	Walker Lake Cy.....	Dismissed.
82-100	Gosse Packing Co., Ltd.	Fishing during closed period.	Salmon Bay.....	Dismissed.
101	Gosse Packing Co., Ltd.	Illegal possession of salmon.	Nannu Cannery.....	Dismissed.
102	Gosse Packing Co., Ltd.	Illegal possession of salmon.	Bella Bella Cy.....	Dismissed.
103	B.C. Fishing & Packing Co., Ltd.	Fishing during closed period.	District No. 2.....	Dismissed.
122				
123	Ben Self.....	Fishing for salmon without a license.	Rawlanson Anchor.....	Appeal allowed and fine returned.
124	John Wick.....	Fishing for salmon without a license.	Rawlanson Anchor.....	Fined \$50.00 and \$100.00 costs.
125	Silas Brown.....	Selling salmon above a tidal boundary.	Kitwanga.....	Fined \$15.00 and costs.

BRITISH COLUMBIA—DISTRICT NO. 3—Inspector A. J. TAYLOR

1	Alex Hulkanem.....	Contravention of Sec. 21 (2).....	Cowichan River.....	Fined \$5.00.
2	C. Koyange.....	Contravention of Sec. 21 (2).....	Cowichan River.....	Fined \$5.00 and costs.
3	Tommy Paul.....	Contravention of Sec. 21 k (1).....	Saanich Arm.....	Fined \$15 and costs.
4	Chief Peter Dick and Willie Jack	Contravention of Sec. 21 (q).....	Chee-what River.....	Fined \$1.00 in each case, salmon conf.
5	Russell Hetzler.....	Contravention of sec. 6 (b).....	Stuart Island.....	Fined \$25.00.
6	Eric Wickham.....	Contravention of Sec. 2.....	Nitinat Arm.....	Fined \$15 and costs.
7	Dan Woodward.....	Contravention of Sec. 2 (a) Reg. and Sec. 50 of Act.		Fined \$5.00 and \$1.00 costs.
8	Alfred Johnson.....	Contravention of Sec. 21, subsec. 17.....	Sauchauch Creek.....	Fined \$50.00.
9	Harry Moon.....	Contravention of Sec. 15, subsec. 1 (a).....	Hayden Bay.....	Dismissed.
10	Josiah Russell.....	Contravention of Sec. 21, Subsec. 17.....	Sauchauch Creek.....	Fined \$25 and costs.
11	A. Martinolich.....	Contravention of Sec. 21, subsec. 19.....	Uchucktest Harbour.....	Fined \$175 and costs.
12	Ole Lee.....	Contravention of Sec. 24, Subsec. 2 (B).....	Sauchauch Creek.....	Fined \$25 and costs.
13	John Salo.....	Contravention of Sec. 22, 7.....	Wakeman Sound.....	Fined \$100.00.

14	Victor Ferrario.....	Contravention of Sec. 15, Subsec. 1a.	Salmon River.....	Fined \$100.00.
15	Martin Arnet.....	Contravention of Sec. 21, Subsec. 17 (a).	Sarita River.....	Fined \$200 and costs, license cancelled.
16	R. E. B. Hunt and F. Duffy.....	Contravention of Sec. 21.....	Nahwitti River.....	Dismissed.
17	Gilbert Francis.....	Contravention of Sec. 21, subsec. 17 (a).	Homalka River.....	Fined \$50.
18	Frederick Bruce Spieher.....	Contravention sec. 15, Subsec. 4 and Sec. 29, Subsec. 1.	MacKenzie Sound.....	Dismissed, 321 salmon confiscated.
19	Dan Watts.....	Contravention Sec. 2, para B. of sec. 24.	Barclay Sound.....	Fined \$25 and costs, 85 salmon conf.
20	Fred Kline.....	Contravention of sec. 24, 2b.	Portford Harbour.....	Fined \$20.00.
21	Dave Paul.....	Contravention of sec. 21, subsec. 17 (a).	Orford Bay.....	Fined \$50 and costs.
22	Victor Ferrario.....	Contravention of sec. 21, subsec. 19.	Port Neville.....	Dismissed.
23	Tahsis Packing Co., Ltd.....	Contravention of sec. 24, para. 4 (a) and (d).	Nootka Sound.....	Fined \$25.00 on each charge, purse-seine and salmon confiscated.
24	Michael Brown.....	Contravention of Sec. 21, subsec. 17 (a).	Coleman Creek.....	Dismissed.
25	Ernest Silvey.....	Contravention of Sec. 21, Subsec. 17 (a).	Jervis Inlet.....	Fined \$60 and costs, license cancelled.
26	R. Tabata & Co.....	Contravention of Order in Council, July 24, 1922, P.C. 1552 (Fish Curing).	Jesse Island.....	Fined \$100 and costs.
27	Ralph Birdwhistle.....	Contravention of Sec. 21, Subsec. 21, Fish Regs.	Victoria, B.C.....	Fined \$10.00 and costs. Conf. cod and salmon.
28	North West Fisheries, Davies Island Plant.....	Contravention of para. 7 and 3 Order in Council of July 24, 1922, P.C. 1552.	Davis Island.....	Fined \$15.00 and \$5.00 and costs.
29	Harry Marsden.....	Contravention of Sec. 21, Subsec. 2 and Sec. 29, Subsec. 1.	Deep Water Bay.....	Fined \$25.00 on each count.
30	Thomas Liston.....	Contravention of Sec. 29 of Fish. Act in the vicinity of Nanaimo.	Nanaimo.....	Fined \$1.00 and license cancelled and conf. of 1 gill net and 3 codfish.
31	Toshigusa Hama.....	Contravention of Sec. 29 of Fish. Act in the vicinity of Nanaimo.	Nanaimo.....	Fined \$1.00 each and costs.
32	Geo. Reynolds.....	Contravention of Sec. 29 of Fish Act in the vicinity of Nanaimo.	Nanaimo.....	Fined \$1.00 each and costs.
33	Eugene Philion, Fred Larson, S. Barrow, A. E. Ralf, Chas. E. Stratton, John Johnstone, Ed. Seaplen.....	Contravention of Sec. 2, Subsec. 1 Fish. Regs.	Saanich.....	Fined \$1.00 each and costs.
34	Chief Jonny.....	Contravention of Sec. 21, Subsec. 17 (a) Regs.	Rupert Arm.....	Fined \$25.00.
35	H. J. Stump.....	Contravention of Sec. 24, Subsec. 1 of the Regs.	Embley Lagoon.....	Fined \$400.00.
36	Hotel (Whiskers).....	Contravention of Sec. 24, Subsec. 2 B. of the Regs.	Ingersoll River.....	Fined \$10.00.
37	Hotel (Whiskers).....	Contravention of Sec. 24, Subsec. 2 B. of the Regs.	Ingersoll River.....	Case dismissed.
38	John Buema.....	Contravention of Sec. 15, Subsec. 1A, 29, Subsec. 1 and 21 of Subsec. 2.	Pender Harbour.....	Fined \$5.00, \$5.00 and \$2.50 respectively and costs.
39	J. W. Johnstone.....	Contravention of Sec. 29, Subsec. 1 and 21, Subsec. 2.	Pender Harbour.....	Fined \$5.00 and \$5.00 respectively and costs.
40	George Simpson.....	Contravention of Sec. 15, Subsec. 1a, Sec. 29, Subsec. 1 and 21, Subsec. 2.....	Pender Harbour.....	Fined \$5.00, \$5.00 and \$2.50 respectively and costs.
41	Donald Keen.....	Contravention of Sec. 15, Subsec. 1a, Sec. 29, Subsec. 2 and 21, Subsec. 2.	Pender Harbour.....	Fined \$5.00, \$5.00 and \$2.50 respectively and costs.
42	Maynard Dubois.....	Contravention of Sec. 15 Subsec. 1 A, Sec. 29, Subsec. 1 and 21, Subsec. 2.	Pender Harbour.....	Fined \$5.00, \$5.00 and \$2.50 respectively and costs.
43	Dalton A. Burt.....	Contravention of Sec. 29, Subsec. 1, Subsec. 2.	Pender Harbour.....	Fined \$5.00 and \$5.00 respectively and costs.
44	Alex. Thompson.....	Contravention of Sec. 29, Subsec. 1, Subsec. 2.	Pender Harbour.....	Fined \$5.00 and \$5.00 respectively and costs.
45	Mikal Christianson.....	Contravention of Sec. 29, Subsec. 1, Subsec. 2.	Pender Harbour.....	Fined \$5.00 and \$5.00 respectively and costs.

## APPENDIX No. 9

STATEMENT OF EXPENDITURE AND REVENUE, BY PROVINCES IN FISHERIES  
SERVICES 1867-1927 UNDER DOMINION GOVERNMENT

	SUMMARY	Expenditure	Revenue
Nova Scotia.....	4,175,528 24	312,588 31	
Prince Edward Island.....	677,542 46	95,562 72	
New Brunswick.....	3,263,922 18	538,434 45	
Quebec.....	2,425,604 18	341,069 29	
Ontario.....	3,214,671 13	520,135 96	
Manitoba and N.W.T.....	23,414 29	4,779 25	
Manitoba.....	1,573,435 25	268,564 58	
N. W. Territories.....	58,258 58	9,775 23	
Alberta.....	317,057 94	158,124 48	
Saskatchewan.....	483,944 10	81,550 64	
British Columbia.....	10,078,488 93	2,574,271 02	
Yukon.....	29,343 94	10,292 75	
Hudson Bay Dist.....		821 83	
<i>Cruisers</i>			
N.S., P.E.I. and N.B.....	4,741,985 72		
	31,063,196 94		
<i>Expenditures General</i> .....	2,905,060 46		
<i>Fishing Bounty—</i>	33,968,257 40		
1882-1927.....	7,278,904 21		
	41,247,161 61	Total Expt.	
		1867-1927	

## FISHING BOUNTIES

Year	Nova Scotia	New Brunswick	Prince Edward Island	Quebec	Totals
1882.....	\$106,098 72	\$16,997 00	\$16,137 00	\$33,052 75	\$172,285 47
1883.....	89,432 50	12,395 20	8,577 14	19,940 01	130,344 85
1884.....	104,934 09	13,576 00	9,230 96	28,004 93	155,718 98
1885.....	103,999 73	15,908 25	10,166 65	31,464 76	161,539 39
1886.....	98,789 54	17,894 57	10,935 87	33,283 61	160,903 59
1887.....	99,662 03	19,699 65	12,528 51	31,907 73	163,757 92
1888.....	89,778 90	18,454 92	9,092 96	32,858 75	150,185 53
1889.....	90,142 51	21,026 79	13,994 53	33,362 71	158,526 54
1890.....	91,235 64	21,108 33	11,686 32	34,210 72	158,241 01
1891.....	92,377 42	17,235 96	12,771 30	34,507 17	156,891 85
1892.....	109,410 39	10,864 61	9,782 79	29,694 35	159,752 14
1893.....	108,060 67	12,524 09	9,328 62	28,320 72	158,234 10
1894.....	111,460 03	12,690 80	7,875 79	28,040 18	160,066 80
1895.....	110,765 27	12,919 32	9,285 13	30,598 27	163,567 99
1896.....	98,048 95	13,602 88	9,745 50	32,992 44	154,389 77
1897.....	102,083 50	13,454 50	9,809 00	32,157 00	157,504 00
1898.....	103,730 00	13,746 00	10,188 00	31,795 00	159,459 00
1899.....	106,598 50	13,514 50	7,822 00	32,065 00	160,000 00
1900.....	101,448 00	13,562 50	10,589 00	33,203 00	158,802 50
1901.....	101,024 50	13,420 50	8,335 50	33,161 50	155,942 00
1902.....	100,455 70	14,555 80	8,716 55	36,125 45	159,853 50
1903.....	99,714 15	14,872 75	9,652 50	34,704 30	158,943 70
1904.....	99,286 44	15,110 80	9,179 35	33,651 65	157,228 24
1905.....	100,664 35	15,379 50	8,317 20	34,185 60	158,546 65
1906.....	99,518 80	16,247 55	8,839 40	34,410 00	159,015 75
1907.....	93,381 70	16,454 50	10,175 95	36,101 35	156,113 50
1908.....	98,156 20	17,203 75	9,708 90	34,931 05	159,999 90
1909.....	95,413 60	15,480 15	8,973 85	35,354 25	155,221 85
1910.....	96,468 20	16,531 05	9,557 80	36,609 70	159,166 75
1911.....	99,424 90	15,795 00	8,669 85	36,109 95	159,999 70
1912.....	97,904 25	15,109 75	11,119 00	35,863 40	159,996 40
1913.....	93,456 00	16,385 05	11,081 85	37,738 35	158,661 25
1914.....	94,990 54	17,536 50	10,339 65	36,717 45	159,584 14
1915.....	90,611 05	17,609 95	9,513 95	41,006 10	158,741 05
1916.....	88,212 10	17,540 15	9,961 95	44,285 60	159,999 80
1917-18.....	86,115 60	17,538 35	10,754 75	45,484 40	159,893 10
1918-19.....	85,000 65	17,114 35	10,392 35	47,167 90	159,675 25
1919-20.....	85,521 05	16,085 20	8,702 20	44,828 25	155,136 70
1920-21.....	93,873 00	13,773 70	8,110 70	36,761 90	152,519 30
1921-22.....	91,410 20	14,640 60	9,413 00	43,986 00	159,449 80
1922-23.....	93,254 45	16,311 25	7,704 40	39,902 45	157,172 55
1923-24.....	91,261 55	16,123 25	10,153 65	42,378 35	159,916 80
1924-25.....	86,300 20	15,634 05	11,410 15	46,482 00	159,826 40
1925-26.....	82,550 35	18,824 30	10,670 70	47,939 45	159,984 80
1926-27.....	83,006 90	16,721 00	13,221 55	46,818 65	159,768 10
1927-28.....	82,107 00	19,906 80	12,095 45	44,266 55	158,375 80
	4,427,099 82	729,081 47	464,292 22	1,658,430 70	7,278,904 21

STATEMENT SHOWING THE ANNUAL EXPENDITURE ON ACCOUNT OF MARINE  
POLICE SERVICE ON THE ATLANTIC COASTS OF CANADA FOR PATROLLING  
THE TERRITORIAL FISHERIES 1870-1874 INCLUSIVE

1870.....	\$		
1871.....		73,550	86
1872.....		50,123	24
1873.....		53,794	90
1874.....		15,364	69
			<hr/>
			192,833 69

During the period 1875 to 1885, inclusive, the Washington Treaty, which gave United States fishermen the use of Canadian Inshore fisheries, was in force.

On the expiry of the Fishery Articles of the Treaty of Washington, the present Fisheries Protection Service was organized in 1886. The following is a statement of the annual expenditure on such account from 1886 to 1927-28 inclusive.

## FISHERIES PROTECTION SERVICE

In addition to Cruisers, entered under Ontario, Quebec and British Columbia:—

1886.....	\$	104,020	98
1887.....		86,300	74
1888.....		59,869	47
1889.....		47,748	94
1890.....		51,296	34
1891.....		81,918	99
1892.....		84,305	51
1893.....		60,269	69
1894.....		70,501	71
1895.....		61,310	19
1896.....		64,064	00
1897.....		71,349	44
1898.....		78,097	10
1899.....		68,330	27
1900.....		66,148	97
1901.....		96,648	26
1902.....		75,942	24
1903.....		75,543	60
1904.....		103,427	32
1905.....		294,440	34
1906.....		136,432	61
1907.....		99,015	07

(No proper division of the expenditure of these roving Cruisers could be made between the Maritime Provinces, although *pro rata* shares are fairly chargeable to N.S., N.B., and P.E.I.)

1908-09.....	\$	114,923	00
1909-10.....		113,582	23
1910-11.....		116,235	21
1911-12.....		120,240	00
1912-13.....		163,370	19
1913-14.....		225,113	26
1914-15.....		95,702	02
1915-16.....		102,637	46
1916-17.....		132,393	60
1917-18.....		118,824	16
1918-19.....		56,256	78
1919-20.....		218,143	93
1920-21.....		227,159	57
1921-22.....		172,003	39
1922-23.....		107,658	85
1923-24.....		95,332	27
1924-25.....		95,714	47
1925-26.....		98,060	10
1926-27.....		113,804	14
1927-28.....		125,015	62
			<hr/>
			4,741,985 72

A pro-rate share of this amount is chargeable to the Provinces of N.S., N.B., and P.E.I.

STATEMENT SHOWING THE ANNUAL EXPENDITURE OF, AND REVENUE COLLECTED BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE SINCE CONFEDERATION

PROVINCE OF PRINCE EDWARD ISLAND

Year	General Service	Cruisers	Fish Breeding	Total	Revenue
	\$		\$	\$	\$
1867					
1868					
1869					
1870					
1871					
1872					
1873					
1874	405 62			405 62	
1875	459 54			459 54	
1876	461 02			461 02	
1877	1,974 70			1,974 70	
1878	1,836 54			1,836 54	
1879	1,293 25			1,293 25	
1880	2,686 49		4,494 24	7,180 83	40 00
1881	2,691 49		852 11	3,543 60	40 00
1882	2,756 48		760 32	3,516 80	40 00
1883	2,716 64		807 32	3,523 96	80 00
1884	2,767 98		771 40	3,539 38	80 00
1885	3,028 03		741 06	3,769 09	40 00
1886	3,187 73		687 17	3,874 90	40 00
1887	4,044 49		1,200 21	5,244 70	128 00
1888	3,402 51		755 32	4,157 83	
1889	3,746 69		140 31	3,887 00	140 00
1890	3,113 21			3,113 21	302 88
1891	3,242 25		378 00	3,620 25	667 00
1892	1,835 65			1,835 65	166 00
1893	2,847 60			2,847 60	304 10
1894	3,078 55			3,078 55	980 15
1895	3,796 58			3,796 58	3,312 30
1896	3,555 87			3,555 87	2,161 85
1897	3,744 36			3,744 36	2,032 25
1898	6,775 78			6,775 78	2,707 57
1899	5,832 35			5,832 35	2,242 24
1900	7,364 20			7,364 20	2,207 12
1901	7,934 03			7,934 03	1,525 30
1902	7,814 02			7,814 02	1,843 45
1903	7,081 60			7,081 60	2,007 35
1904	7,320 96		10,733 51	18,054 47	1,983 42
1905	6,879 05		6,813 77	13,692 82	2,046 50
1906	9,351 81		6,419 04	15,770 85	2,206 25
1907	5,841 67		2,952 47	8,794 14	1,300 94
1908-09	14,996 00		7,187 47	22,183 47	2,393 66
1909-10	13,657 56		8,139 50	21,797 06	2,359 93
1910-11	38,570 72		8,874 42	47,445 14	2,499 63
1911-12	13,661 00		8,876 00	22,537 00	2,477 50
1912-13	13,558 06		6,105 63	19,663 69	2,927 96
1913-14	13,728 89		7,383 45	21,112 34	2,245 60
1914-15	17,369 93		8,071 93	25,441 86	2,046 50
1915-16	14,794 05		9,638 61	24,432 66	3,165 35
1916-17	15,843 23		7,211 18	23,054 41	3,597 18
1917-18	19,076 19		7,994 24	27,070 43	3,256 26
1918-19	15,722 08		3,003 84	18,725 92	2,561 19
1919-20	17,430 98		2,918 40	20,349 38	4,741 68
1920-21	22,911 72		4,312 69	27,224 41	3,720 12
1921-22	15,430 17		4,304 58	19,734 75	2,876 47
1922-23	17,996 16		4,801 56	22,797 72	5,854 88
1923-24	22,111 52		4,859 03	26,970 55	4,441 95
1924-25	26,051 31		5,147 60	31,198 91	3,134 90
1925-26	26,719 74		6,609 94	33,329 68	3,467 88
1926-27	20,302 73		4,533 27	24,836 00	3,403 13
1927-28	19,176 79		5,085 20	24,261 99	3,766 28
	513,977 57		163,564 89	677,542 46	95,562 72

See Cruiser sheet N.S., P.E.I. & N.B.

## STATEMENT SHOWING THE ANNUAL EXPENDITURE OF, AND REVENUE COLLECTED BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE SINCE CONFEDERATION.

(\*Revenue from licenses to U.S. Fishing Vessels to which the Province has no exclusive title.)

## PROVINCE OF NOVA SCOTIA

Year	General Service	Cruisers	Fish Breeding	Total	Revenue
	\$ cts.		\$ cts.	\$ cts.	\$ cts.
1867.....					
1868.....	225 28			225 28	* 12,275 25
1869.....	2,572 23			2,572 23	848 46
1870.....	9,728 26			9,728 26	* 1,373 24
1871.....	8,794 37			8,794 37	36 74
1872.....	8,341 39			8,341 39	51 45
1873.....	8,689 07			8,689 07	150 30
1874.....	10,585 13			10,585 13	123 94
1875.....	12,265 86			12,265 86	551 00
1876.....	14,655 76		6,870 33	21,526 09	403 00
1877.....	15,127 49		3,488 27	18,615 76	1,520 71
1878.....	15,292 83		3,400 00	18,692 83	1,442 38
1879.....	14,312 76		2,687 44	17,000 20	1,796 11
1880.....	14,180 55		3,323 16	17,503 71	1,506 72
1881.....	14,909 42		3,454 29	18,363 71	2,779 49
1882.....	16,479 41		5,858 98	22,338 39	1,111 61
1883.....	16,247 14		4,191 34	20,438 48	2,005 29
1884.....	15,600 01		4,728 11	20,428 12	1,833 18
1885.....	17,503 45		4,610 81	22,114 26	2,616 28
1886.....	17,852 33		7,478 23	25,330 56	2,166 53
1887.....	18,092 21		6,701 89	24,794 00	1,585 28
1888.....	18,308 02		6,850 27	25,158 29	3,905 44
1889.....	20,201 09		6,688 75	26,889 84	2,744 23
1890.....	17,395 24		6,606 95	24,002 19	5,424 95
1891.....	17,844 19		5,863 75	23,707 94	5,891 65
1892.....	18,755 86		10,289 80	29,045 66	3,803 42
1893.....	19,444 22		5,045 22	24,489 44	6,782 02
1894.....	20,420 81		4,982 12	25,402 93	5,296 27
1895.....	23,555 38		5,054 24	28,609 62	7,075 07
1896.....	23,049 41		5,010 39	28,059 80	6,180 93
1897.....	23,682 33		4,077 07	27,759 40	5,239 55
1898.....	21,683 91		3,525 03	25,208 94	5,317 08
1899.....	25,348 11		2,465 19	27,813 30	4,668 22
1900.....	27,461 91		3,410 84	30,872 75	5,494 49
1901.....	35,730 69		11,194 82	46,925 51	6,595 94
1902.....	32,618 00		8,810 31	41,428 31	6,084 65
1903.....	39,118 79		7,413 55	46,532 34	3,962 45
1904.....	30,003 01		6,348 22	36,351 23	3,716 75
1905.....	32,619 85		11,372 65	43,992 50	6,718 58
1906.....	49,351 10		33,203 27	82,554 37	4,934 43
1907.....	24,989 09		6,259 25	31,248 34	3,118 73
1908-09.....	87,420 00		20,969 27	108,389 27	5,369 70
1909-10.....	81,698 70		15,722 27	97,420 97	3,821 81
1910-11.....	117,394 67		28,023 29	145,417 96	7,749 60
1911-12.....	141,148 00		42,727 00	183,875 00	5,912 65
1912-13.....	97,085 48		46,411 56	143,497 04	6,730 00
1913-14.....	125,305 94		45,732 88	171,038 82	7,682 50
1914-15.....	124,977 45		37,470 70	162,448 15	7,415 80
1915-16.....	117,271 06		34,914 01	152,185 07	6,969 18
1916-17.....	126,416 67		33,543 89	159,960 56	7,176 70
1917-18.....	139,964 62		36,057 56	176,022 18	6,663 94
1918-19.....	112,689 57		17,233 22	129,922 79	7,612 81
1919-20.....	92,197 95		16,243 01	108,440 96	10,213 28
1920-21.....	111,196 47		22,077 83	133,274 30	12,189 62
1921-22.....	112,521 25		21,247 10	133,768 35	12,840 39
1922-23.....	121,336 89		27,399 27	148,736 16	12,720 42
1923-24.....	138,671 11		42,395 03	181,066 14	9,480 38
1924-25.....	153,463 48		32,467 75	185,931 23	10,627 54
1925-26.....	170,967 83		31,053 08	202,020 91	9,539 68
1926-27.....	171,975 48		29,869 84	201,845 32	10,973 25
1927-28.....	237,097 63		28,148 93	265,246 56	11,758 25
	3,354,556 21		820,972 03	4,175,528 24	312,588 31

See Cruiser Sheet N.S., P.E.I., and N.B.

## PROVINCE OF NEW BRUNSWICK

Year	General Service	Cruisers	Fish Breeding	Total	Revenue
	\$ cts.		\$ cts.	\$ cts.	\$ cts.
1867.....					
1868.....	5,086 77			5,086 77	443 47
1869.....	4,172 35			4,172 35	* 5,410 58
1870.....	8,422 63			8,422 63	1,086 42
1871.....	7,006 52			7,006 52	1,042 03
1872.....	6,476 61			6,476 61	1,058 29
1873.....	6,859 05		822 33	7,681 38	647 61
1874.....	7,351 17		3,100 13	10,451 30	978 00
1875.....	7,373 75		3,853 73	11,227 48	830 00
1876.....	10,080 37		3,247 41	13,327 78	2,030 91
1877.....	11,168 53		1,388 80	12,557 33	1,289 17
1878.....	10,926 11		1,468 22	12,394 33	2,015 46
1879.....	10,858 64		1,139 00	11,997 64	3,467 36
1880.....	12,291 00		5,600 00	17,891 00	4,276 07
1881.....	11,776 56		3,455 91	15,232 47	4,695 28
1882.....	12,284 82		3,567 28	15,852 10	4,848 84
1883.....	13,007 00		2,646 14	15,653 14	4,612 12
1884.....	14,388 02		2,327 06	16,715 08	3,905 66
1885.....	14,892 87		2,943 98	17,836 85	4,650 16
1886.....	15,719 36		2,852 02	18,571 38	4,078 10
1887.....	16,944 00		2,907 16	19,851 16	4,417 52
1888.....	20,533 20		3,441 59	23,974 79	7,625 64
1889.....	20,298 00		3,150 17	23,448 17	8,642 88
1890.....	14,914 95		3,727 77	18,642 72	8,334 35
1891.....	16,082 77		4,572 41	20,655 18	7,233 69
1892.....	15,707 98		4,304 98	20,012 96	6,634 83
1893.....	15,721 05		4,083 13	20,709 18	7,331 53
1894.....	18,522 94		4,833 27	23,356 21	8,333 24
1895.....	21,370 94		5,896 95	27,267 89	11,170 36
1896.....	20,526 56		6,551 62	27,078 18	10,696 88
1897.....	21,671 92		3,722 01	25,393 93	10,110 77
1898.....	17,063 58		3,958 63	21,022 21	11,511 85
1899.....	22,922 50		7,514 86	30,437 36	10,430 08
1900.....	21,459 94		3,951 58	25,411 52	12,015 27
1901.....	28,452 51		5,976 29	34,428 80	10,150 40
1902.....	23,813 62		12,245 86	36,059 48	11,658 34
1903.....	27,132 84		16,099 01	43,231 85	11,188 02
1904.....	27,664 34		22,177 05	49,841 39	10,643 20
1905.....	25,253 16		15,477 39	40,730 55	11,898 99
1906.....	35,856 38		25,759 00	61,615 47	11,395 84
1907.....	24,938 35		16,900 00	41,838 35	9,158 08
1908-09.....	71,091 00		22,214 39	93,305 39	12,385 14
1909-10.....	63,154 19		21,102 75	84,256 94	13,044 88
1910-11.....	63,769 48		20,414 56	84,184 04	12,996 84
1911-12.....	58,140 00		22,950 00	81,090 00	13,902 15
1912-13.....	60,943 53		30,267 38	91,210 91	15,192 52
1913-14.....	63,653 64		51,641 12	115,294 76	17,507 18
1914-15.....	67,954 09		52,560 08	120,514 17	14,263 99
1915-16.....	65,874 11		40,876 42	106,750 53	15,097 80
1916-17.....	67,645 91		37,987 56	105,633 47	15,137 19
1917-18.....	70,148 87		37,021 69	107,170 56	14,429 53
1918-19.....	67,763 94		36,351 19	104,115 13	16,420 52
1919-20.....	73,821 07		34,275 01	108,096 08	16,441 02
1920-21.....	86,431 23		41,493 38	127,924 61	15,299 82
1921-22.....	102,713 10		44,971 62	147,684 72	16,212 85
1922-23.....	96,836 88		50,298 75	147,135 63	19,286 01
1923-24.....	71,052 58		40,870 11	111,922 69	13,010 14
1924-25.....	97,200 01		46,096 12	143,296 13	11,701 49
1925-26.....	106,052 99		50,910 64	156,963 63	9,754 13
1926-27.....	90,696 49		48,245 23	147,941 72	10,740 76
1927-28.....	113,738 34		102,131 24	215,869 58	12,663 50
	2,214,675 11		1,049,247 07	3,263,922 18	538,434 45

See Cruiser Sheet N.S., P.E.I., and N.B.

## FISHERIES BRANCH

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STATEMENT SHOWING THE ANNUAL EXPENDITURE OF, AND REVENUE COLLECTED BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE SINCE CONFEDERATION.

## PROVINCE OF QUEBEC

Year	General Service		Cruisers		Fish Breeding		Total		Revenue	
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
1867	10,272	82	14,426	53			24,699	35	6,998	90
1868	17,889	92	11,374	95			29,264	87	4,910	87
1869	6,909	61	10,800	00			17,709	61	4,585	80
1870	6,570	42	9,924	51			16,494	93	7,997	21
1871	7,000	00	9,000	00			16,000	00	6,290	85
1872	6,489	68	12,000	00			18,489	68	4,569	69
1873	7,829	94	9,000	00			16,829	94	4,983	83
1874	9,265	31	10,000	00	6,106	00	25,371	31	8,523	54
1875	9,808	34	10,000	00	8,515	46	28,323	80	8,904	85
1876	14,282	65	23,832	82	9,016	74	47,132	21	6,437	00
1877	13,521	44	17,059	21	5,670	86	36,251	51	5,881	72
1878	12,723	88	19,967	11	6,685	85	39,376	84	5,453	27
1879	13,606	06	8,994	48	5,772	90	28,373	44	6,286	07
1880	12,591	78	1,880	08	4,701	34	19,173	20	7,124	42
1881	15,123	79	50,550	18	5,444	89	71,118	86	9,286	18
1882	14,819	22	26,965	40	9,148	68	50,933	30	7,165	32
1883	13,287	30	26,555	46	7,987	12	47,829	88	3,869	47
1884	13,186	26	19,935	53	8,512	11	41,633	90	2,715	02
1885	13,531	77	*31,914	07	10,072	52	55,118	36	3,325	35
1886	13,938	21	26,091	20	9,197	89	49,227	30	2,963	75
1887	14,966	55	18,293	16	8,740	66	42,000	37	3,804	66
1888	13,463	37	17,233	51	8,921	13	39,618	01	5,394	99
1889	12,991	63	16,034	04	10,228	72	39,254	39	3,390	79
1890	9,670	94	15,001	91	8,370	15	33,043	00	5,409	81
1891	10,666	98	15,143	46	9,142	31	34,952	75	3,642	14
1892	10,917	36	14,026	98	8,341	94	33,286	28	5,244	82
1893	11,761	34	14,688	97	9,337	79	35,788	10	7,471	70
1894	11,692	82	25,645	29	8,635	41	45,973	52	7,211	82
1895	12,459	34	19,523	86	8,854	64	40,837	84	8,836	18
1896	11,870	43	20,661	78	8,260	50	40,792	71	8,160	98
1897	12,910	80	12,059	54	7,059	45	32,029	79	7,876	12
1898	11,140	16	13,781	53	6,184	40	31,050	09	7,571	15
1899	11,350	27	21,680	55	5,700	58	38,731	40	6,287	71
1900	5,452	41	18,970	42	12,701	04	37,123	87	2,543	04
1901	7,934	03	16,258	44	15,218	64	39,411	11	4,738	92
1902	6,242	58	24,995	46	20,142	94	51,380	98	2,498	85
1903	6,585	86	21,021	00	8,080	03	35,686	89	4,379	15
1904	7,619	67	23,011	05	11,454	24	42,084	96	5,070	64
1905	6,769	16	15,976	88	14,140	65	36,886	69	4,648	56
1906	8,123	04	26,969	49	12,617	01	47,709	54	7,564	39
1907	5,590	94	22,763	29	10,683	24	39,037	47	8,145	97
1908-09	11,960	00	36,402	00	16,760	46	65,122	46	6,797	91
1909-10	10,316	05	25,811	96	19,292	31	55,420	32	4,947	46
1910-11	8,984	36	42,975	48	20,290	50	72,250	34	5,336	61
1911-12	17,050	00	32,998	00	18,104	00	68,152	00	6,044	75
1912-13	10,998	48	25,321	81	17,152	03	53,472	32	8,095	79
1913-14	9,921	88	29,770	88	23,042	82	62,735	58	5,286	89
1914-15	11,503	00	30,644	81	22,000	08	64,147	89	7,639	75
1915-16	6,995	74	31,893	30	17,323	62	56,212	66	6,006	89
1916-17	7,168	09	26,356	47	14,274	14	47,798	70	6,981	14
1917-18	8,399	76	42,752	33	19,727	25	70,879	34	7,664	73
1918-19	7,470	58	41,563	30	12,923	27	61,957	15	8,121	80
1919-20	9,793	46	33,679	99	13,125	26	56,598	71	8,085	78
1920-21	33,182	26	45,963	09	15,955	38	95,100	73	6,536	90
1921-22	23,815	41	49,947	22	18,772	19	92,134	82	14,357	39
1922-23	2,146	60	904	32	2,668	48	5,719	40		
1923-24	282	90	143	81			426	71		
1924-25	178	47					178	47		
1925-26	596	52					596	57		
1926-27	123	12					123	12		
1927-28	144	84					144	84		
623,859		65	1,240,740	91	561,003	62	2,425,604	18	341,069	29

## PROVINCE OF ONTARIO

Year	General Service		Cruisers		Fish Breeding		Total		Revenue		
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	
1867	6,108	00					6,108	00	3,492	00	
1868	6,526	96					6,526	96	1,927	02	
1869	8,547	65					8,547	65	2,739	13	
1870	5,995	72			2,874	47	8,870	19	6,185	56	
1871	5,825	98			4,446	34	10,272	32	5,039	35	
1872	4,364	43			5,529	73	9,894	16	4,818	57	
1873	4,344	32			3,697	16	8,041	48	4,547	50	
1874	8,969	06			5,100	00	14,069	06	4,386	75	
1875	8,388	81			5,635	74	14,024	55	4,478	05	
1876	12,815	73			12,920	90	25,736	63	4,640	21	
1877	13,521	44			12,132	70	25,654	14	4,673	25	
1878	12,723	88			4,949	77	17,673	65	5,202	00	
1879	11,741	40			7,102	54	18,843	94	6,188	80	
1880	12,003	37			5,300	71	17,304	08	6,465	95	
1881	11,506	74			5,422	63	16,929	37	7,795	99	
1882	11,729	77			8,655	82	20,385	59	9,849	18	
1883	13,602	00			7,761	45	21,363	45	9,980	28	
1884	15,192	73			8,011	17	23,203	90	11,345	14	
1885	17,135	98			8,690	15	25,826	13	11,914	37	
1886	17,900	74			9,696	54	27,597	28	15,917	62	
1887	19,534	01			8,880	14	28,414	15	15,063	57	
1888	19,860	52			9,529	00	29,389	52	18,251	25	
1889	19,264	98	2,631	46	11,311	33	33,207	77	24,266	06	
1890	14,539	87	2,254	63	11,494	31	28,288	81	23,666	95	
1891	15,540	30	2,769	29	11,769	81	30,079	40	26,611	70	
1892	15,155	83	5,064	91	9,281	37	29,502	11	26,708	00	
1893	20,116	91	32,940	56	11,194	65	64,252	12	30,623	09	
1894	22,634	37	20,022	18	10,821	43	53,477	98	28,632	82	
1895	21,938	56	19,373	24	8,755	93	50,067	73	33,211	60	
1896	24,917	48	17,295	94	9,468	37	51,681	79	35,681	68	
1897	21,592	40	15,948	43	8,774	19	46,315	02	32,814	66	
1898	19,239	34	15,155	43	9,976	74	44,371	51	30,574	57	
1899	11,784	22	15,122	45	9,982	10	36,888	97	5,830	85	
1900	3,604	94	12,250	72	10,675	72	26,531	38	794	12	
1901	3,819	57	11,304	51	12,835	60	27,959	68	717	35	
1902	4,445	93	11,764	87	12,445	31	28,656	11	373	42	
1903	4,660	53	12,334	37	14,844	36	31,839	26	1,818	83	
1904	4,500	43	45,138	10	15,300	46	64,933	99	2,578	48	
1905	4,294	60	109,560	51	13,832	32	127,687	43	1,471	91	
1906	4,949	67	32,585	51	15,069	17	52,604	35	499	15	
1907	3,188	34	32,698	85	14,112	42	49,999	61	349	10	
1908-09	14,898	00	36,038	00	28,358	02	79,294	02	790	78	
1909-10	9,672	24	26,000	14	22,614	30	58,295	68	1,520	75	
1910-11	11,788	30	24,237	49	24,393	21	60,419	00	280	25	
1911-12	28,127	00	28,006	00	47,611	00	103,744	00	658	45	
1912-13	13,213	90	30,015	23	61,580	26	104,809	41	548	74	
1913-14	22,733	57	27,650	61	68,877	81	119,261	99	806	69	
1914-15	23,048	82	30,169	08	103,182	20	156,400	10	918	80	
1915-16	19,468	64	28,216	58	63,712	73	111,397	95	2,600	65	
1916-17	14,588	69	25,994	06	85,922	62	126,505	37	808	70	
1917-18	15,838	94	36,708	63	69,864	18	122,411	75	2,345	48	
1918-19	4,586	56	53,404	30	64,996	55	122,987	41	631	85	
1919-20	247	00	39,575	17	75,479	78	115,301	95	1,421	80	
1920-21	5	09	84,373	39	82,320	21	166,698	69	9,221	25	
1921-22			52,260	83	80,403	37	132,664	20	44,425	97	
1922-23			27,901	41	79,690	16	107,591	57	4,169	29	
1923-24			355	62	84,180	87	84,536	49	6,076	71	
1924-25					79,471	88	79,471	88	957	73	
1925-26					79,938	10	79,938	10	9,719	28	
1926-27					19,894	97	19,894	97	126	91	
1927-28					25	38	25	38			
		666,744	26	967,128	52	1,580,800	35	3,214,671	13	520,135	96

# FISHERIES BRANCH

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## MANITOBA AND NORTHWEST TERRITORIES

Year	General Service	Cruisers	Fish Culture	Total	Revenue
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1867-68.					
1868-69.					
1869-70.					
1870-71.					
1871-72.					
1872-73.					
1873-74.					
1874-75.	288 65			288 65	
1875-76.					
1876-77.	250 00			250 00	
1877-78.	200 00			200 00	
1878-79.	200 00			200 00	
1879-80.	19 75			19 75	
1880-81.					
1881-82.	809 55			809 55	
1882-83.	150 00			150 00	
1883-84.	872 40			872 40	
1884-85.	763 00			763 00	
1885-86.	1,920 73			1,920 73	
1886-87.	2,468 25			2,468 25	5 00
1887-88.	2,816 64			2,816 64	819 25
1888-89.	2,848 16			2,848 16	848 00
1889-90.	2,604 70			2,604 70	794 00
1890-91.	3,609 03			3,609 30	1,294 00
1891-92.	3,593 43			3,593 43	1,079 00
	23,414 29			23,414 29	4,779 25

NOTE.—Subsequent to 1892, see Manitoba and Northwest Territories Separate Sheets.

## STATEMENT SHOWING THE ANNUAL EXPENDITURE OF, AND REVENUE COLLECTED BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE SINCE 1892.

### PROVINCE OF MANITOBA

Year	General Service	Cruisers	Fish Culture	Total	Revenue
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1892-93.	2,162 55		6,943 35	9,105 90	1,464 68
1893-94.	2,187 35		7,362 53	9,549 88	715 85
1894-95.	2,663 55		3,849 98	6,513 53	2,149 30
1895-96.	3,952 18		2,865 69	6,817 87	1,670 19
1896-97.	1,908 14		24 79	1,932 93	1,719 00
1897-98.	1,206 26		1,586 12	2,792 38	1,515 00
1898-99.	1,883 37		3,967 36	5,850 73	1,537 85
1899-00.	1,723 59		2,791 71	4,515 30	2,028 00
1900-01.	2,669 74		4,174 53	6,844 27	1,103 00
1901-02.	2,624 87		2,622 43	5,247 30	2,279 00
1902-03.	3,129 70		2,415 09	5,544 79	1,784 00
1903-04.	2,789 74		3,978 04	6,767 78	4,002 70
1904-05.	2,800 64		7,041 67	9,842 31	4,879 70
1905-06.	3,687 07	7,867 70	25,923 29	37,478 06	4,148 00
1906-07.	2,173 33	55 00	15,858 35	18,086 68	2,285 98
1907-08.	4,638 51	13,903 95	25,283 46	43,825 92	3,527 05
1908-09.	3,946 00	7,560 00	16,987 13	28,493 13	3,704 22
1909-10.	9,359 23	7,794 02	14,386 86	31,540 11	3,962 88
1910-11.	9,423 70	7,309 55	15,161 39	31,894 64	8,137 75
1911-12.	7,371 00	6,571 00	15,793 00	29,735 00	6,334 00
1912-13.	7,062 15	12,298 62	40,801 11	60,161 88	6,039 00
1913-14.	29,694 13	48,006 49	47,769 97	125,470 59	4,846 50
1914-15.	28,887 50	172,677 12	31,532 95	233,097 57	8,312 08
1915-16.	13,518 89	61,986 35	26,654 36	102,159 60	5,926 00
1916-17.	13,228 17	19,122 24	25,750 64	58,101 05	8,252 27
1917-18.	13,164 99	18,943 45	28,277 84	60,386 28	12,910 65
1918-19.	11,647 78	22,058 23	29,405 83	63,111 84	12,730 20
1919-20.	8,704 69	21,176 75	26,379 94	56,261 38	12,139 17
1920-21.	10,979 14	16,787 94	38,893 96	66,661 04	17,792 58
1921-22.	14,458 95	23,624 52	33,850 69	71,934 16	11,636 54
1922-23.	17,570 39	21,852 05	30,787 33	70,209 77	12,736 68
1923-24.	14,630 97	20,051 25	28,429 89	63,112 11	15,683 38
1924-25.	14,197 83	21,519 12	25,646 64	61,363 59	17,631 21
1925-26.	17,172 70	22,251 26	21,265 04	60,689 00	17,908 00
1926-27.	16,679 07	21,775 71	19,924 81	58,379 59	21,291 05
1927-28.	21,379 96	15,623 11	22,954 22	59,957 29	23,781 18
	325,277 83	590,815 43	657,341 99	1,573,435 25	268,564 58

NOTE.—Prior to 1892 see Manitoba and Northwest Territories.

## MARINE AND FISHERIES

STATEMENT SHOWING ANNUAL EXPENDITURE OF, AND REVENUE COLLECTED BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE SINCE 1906.

## PROVINCE OF SASKATCHEWAN

Year	General Services		Cruisers		Fish Culture		Total		Revenue	
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
1906-07.....	2,677	77					2,677	77		509 00
1907-08.....	7,277	49					7,277	49		948 60
1908-09.....	6,591	00					6,591	00		1,085 50
1909-10.....	6,474	57					6,474	57		1,209 44
1910-11.....	10,470	46					10,470	46		1,246 00
1911-12.....	* 26,040	00					* 26,040	00		1,304 75
1912-13.....	* 17,850	00					* 17,850	00		4,268 50
1913-14.....	* 24,964	74			* 13,969	84	* 38,934	58	*	8,253 05
1914-15.....	* 34,130	50			20,642	23	54,772	73		4,329 65
1915-16.....	* 31,294	44			4,714	72	36,009	16		3,195 00
1916-17.....	16,002	77			4,897	97	20,900	74		3,103 25
1917-18.....	16,959	11			5,732	96	22,692	07		3,643 65
1918-19.....	16,966	00			5,529	72	22,495	72		4,982 83
1919-20.....	19,019	11			4,147	16	23,166	27		4,321 00
1920-21.....	12,700	20			7,180	29	19,880	49		4,077 30
1921-22.....	15,330	53			6,157	00	21,487	53		3,474 31
1922-23.....	14,212	56			7,887	32	22,099	88		2,904 65
1923-24.....	14,281	88			6,981	38	21,263	26		3,589 50
1924-25.....	16,469	50			8,505	56	24,975	06		6,706 39
1925-26.....	18,156	07			6,873	95	25,030	02		6,066 35
1926-27.....	18,590	43			6,878	44	25,468	87		6,057 68
1927-28.....	19,593	93			7,792	50	27,386	43		6,274 24
	366,053	06			117,891	04	483,944	10		81,550 64

\*Includes Alberta.

STATEMENT SHOWING THE ANNUAL EXPENDITURE OF, AND REVENUE COLLECTED BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE SINCE 1906.

## PROVINCE OF ALBERTA

Year	General Service		Cruisers		Fish Culture		Total		Revenue	
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.
1906-07.....	3,681	45					3,681	45		2 50
1907-08.....	5,440	66					5,440	66		2 50
1908-09.....	5,714	00					5,714	00		915 00
1909-10.....	8,063	22					8,063	22		703 00
1910-11.....	10,739	86					10,739	86		698 50
1911-12.....	*						*			709 00
1912-13.....	*						*			
1913-14.....	*						*			
1914-15.....	*				5,608	42	5,608	42		6,102 50
1915-16.....	*				4,798	69	4,798	69		5,237 85
1916-17.....	15,086	14			4,543	09	19,629	23		5,970 40
1917-18.....	13,262	62			4,127	81	17,390	43		9,767 94
1918-19.....	50,267	84			4,920	96	20,188	80		10,288 15
1919-20.....	15,633	19			7,203	06	22,836	25		8,313 85
1920-21.....	12,700	20			8,617	04	21,317	24		8,693 75
1921-22.....	12,473	92			9,956	33	22,430	25		10,119 30
1922-23.....	13,690	46			6,552	84	20,243	30		11,947 80
1923-24.....	13,880	42			6,419	16	20,299	58		10,111 50
1924-25.....	16,431	37			5,280	07	21,711	44		12,708 13
1925-26.....	18,744	72			8,255	38	27,000	10		14,932 99
1926-27.....	21,391	73			8,345	03	29,736	76		20,233 41
1927-28.....	22,435	76			7,792	50	30,228	26		20,666 41
	224,637	56			92,420	38	317,057	94		158,124 48

\*Included in Saskatchewan.

STATEMENT SHOWING THE ANNUAL EXPENDITURE OF, AND REVENUE COLLECTED BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE SINCE 1892.

## NORTHWEST TERRITORIES

Year	General Service	Cruisers	Fish Culture	Total	Revenue
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1892-93.....	1,770 41			1,770 41	197 00
1893-94.....	3,143 94			3,143 94	211 14
1894-95.....	3,515 16			3,515 16	309 50
1895-96.....	2,963 02			2,963 02	586 50
1896-97.....	2,181 58			2,181 58	344 13
1897-98.....	2,324 66			2,324 66	393 87
1898-99.....	4,065 68			4,065 68	150 50
1899-00.....	3,848 25			3,848 25	1,522 50
1900-01.....	6,251 39			6,251 39	816 55
1901-02.....	5,928 22			5,928 22	950 07
1902-03.....	7,076 26			7,076 26	1,350 50
1903-04.....	7,317 49			7,317 49	922 50
1904-05.....	7,003 55			7,003 55	1,151 50
1905-06.....	11,124 22			11,124 22	868 97
	58,258 58			58,258 58	9,775 23

NOTE.—For Alberta and Saskatchewan subsequent to 1906 see separate statements for each.

STATEMENT SHOWING ANNUAL EXPENDITURE OF, AND REVENUE COLLECTED BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE.

## HUDSON BAY DISTRICT

Year	General Service	Cruisers	Fish Culture	Total	Revenue
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1903-04.....					10 00
1904-05.....					10 00
1905-06.....					10 00
1906-07.....					10 00
1907-08.....					360 00
1908-09.....					20 00
1909-10.....					301 83
1910-11.....					100 00
					821 83

STATEMENT SHOWING ANNUAL EXPENDITURE OF, AND REVENUE COLLECTED  
BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE  
SINCE CONFEDERATION.

PROVINCE OF BRITISH COLUMBIA

Year	General Service	Cruisers	Fish Culture	Total	Revenue
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1867					
1868					
1869					
1870					
1871					
1872					
1873					
1874					
1875					
1876					
1877	635 00			635 00	
1878	690 00			690 00	
1879	1,423 73			1,423 73	
1880	1,399 92			1,399 92	10 00
1881	1,721 48			1,721 48	
1882	1,599 08			1,599 08	672 50
1883	1,599 92			1,599 92	790 00
1884	2,231 97		3,704 31	5,936 28	127 50
1885	1,437 13		11,873 17	13,310 30	365 50
1886	1,878 53		5,405 87	7,284 40	922 50
1887	5,860 72		4,623 35	10,484 07	943 50
1888	3,661 83		5,653 90	9,315 73	6,934 55
1889	4,333 63		4,933 26	9,266 89	6,416 00
1890	3,634 41		4,202 61	7,837 02	11,367 50
1891	4,320 53		3,339 51	7,660 04	12,914 02
1892	6,158 17		2,896 57	9,054 74	8,192 48
1893	5,490 60		3,630 68	9,121 28	40,264 00
1894	5,283 21		3,273 10	8,556 31	25,337 90
1895	6,218 74		2,869 19	9,087 93	23,517 25
1896	6,226 77		2,817 02	9,043 79	26,410 75
1897	8,841 64		2,840 62	11,682 26	39,888 82
1898	8,508 79		2,359 46	10,898 25	47,864 75
1899	8,459 47		3,736 14	12,195 61	45,801 75
1900	13,662 17		2,741 88	16,404 05	53,195 35
1901	17,886 36		17,709 77	35,596 13	52,960 35
1902	18,660 73	40,122 50	20,508 57	79,291 80	41,178 65
1903	17,808 45	36,239 02	23,275 29	77,322 76	43,015 62
1904	15,133 65	33,083 19	25,040 81	73,257 65	56,904 34
1905	16,631 37	42,104 39	61,675 57	120,411 33	47,436 00
1906	30,141 35	54,113 76	83,687 16	167,942 25	51,532 50
1907	20,381 97	84,228 34	39,379 94	93,990 25	29,903 95
1908-09	55,951 00	86,151 00	64,149 57	206,251 57	39,251 65
1909-10	44,799 61	306,185 98	66,847 35	417,832 94	41,864 80
1910-11	99,794 13	80,532 84	97,848 04	278,175 01	45,846 70
1911-12	43,265 00	133,558 00	75,907 00	252,730 00	44,898 51
1912-13	110,779 22	221,061 83	68,719 37	400,560 42	48,824 50
1913-14	129,393 33	501,715 55	83,123 10	714,231 98	52,835 50
1914-15	227,807 84	153,082 83	77,340 42	458,231 09	41,423 95
1915-16	112,827 34	138,594 96	66,071 97	317,494 27	46,862 54
1916-17	106,861 03	109,234 29	55,615 62	271,710 94	47,327 84
1917-18	123,295 97	117,621 80	54,359 16	295,276 93	53,515 21
1918-19	138,876 49	104,048 17	59,048 99	301,973 65	59,349 94
1919-20	176,973 35	243,141 41	111,918 01	532,032 77	270,698 41
1920-21	188,597 86	393,096 67	130,421 69	712,116 22	233,282 04
1921-22	137,662 63	382,272 93	134,628 71	654,564 27	153,904 33
1922-23	137,343 43	304,771 79	113,437 53	555,552 75	223,657 57
1923-24	131,580 83	297,600 19	121,182 83	550,363 85	122,435 24
1924-25	128,897 11	273,227 13	124,025 49	526,149 73	86,218 79
1925-26	167,560 18	255,491 62	126,095 12	549,146 92	117,755 80
1926-27	211,667 84	276,838 74	108,987 77	597,494 35	116,072 66
1927-28	218,889 30	331,157 07	112,532 65	662,579 02	53,377 01
	2,934,744 79	4,949,276 00	2,194,468 14	10,078,488 93	2,574,271 02

STATEMENT SHOWING ANNUAL EXPENDITURE OF, AND REVENUE COLLECTED  
BY THE DOMINION GOVERNMENT ON ACCOUNT OF THE FISHERIES SERVICE  
SINCE 1900.

## YUKON

Year	General Service	Cruisers	Fish Culture	Total	Revenue
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
1900-01.....	1,159 81			1,159 81	406 00
1901-02.....	2,066 66			2,066 66	1,130 00
1902-03.....	1,522 00			1,522 00	320 00
1903-04.....	1,400 00			1,400 00	240 00
1904-05.....	1,400 00			1,400 00	340 00
1905-06.....	1,083 31			1,083 31	282 00
1906-07.....	1,030 35			1,030 35	173 00
1907-08.....	1,226 30			1,226 30	274 00
1908-09.....	1,019 00			1,019 00	228 00
1909-10.....	2,416 63			2,416 63	457 00
1910-11.....	1,984 95			1,984 95	907 50
1911-12.....	2,095 00			2,095 00	203 25
1912-13.....	1,909 83			1,909 83	342 00
1913-14.....	1,520 00			1,520 00	226 00
1914-15.....	2,158 80			2,158 80	304 00
1915-16.....	1,794 75			1,794 75	315 00
1916-17.....	1,482 65			1,482 65	275 00
1917-18.....	1,530 75			1,530 75	375 00
1918-19.....	531 50			531 50	425 00
1919-20.....	11 65			11 65	215 00
1920-21.....					280 00
1921-22.....					375 00
1922-23.....					320 00
1923-24.....					330 00
1924-25.....					340 00
1925-26.....					355 00
1926-27.....					350 00
1927-28.....					505 00
	29,343 94			29,343 94	10,292 75

## APPENDIX NO. 10

REPORT OF MR. J. J. COWIE AND MR. G. R. EARL ON THEIR WORK  
IN CONNECTION WITH THE IMPERIAL ECONOMIC COMMIT-  
TEE'S INQUIRY INTO THE MARKETING OF FISH PRO-  
DUCTS OF THE EMPIRE (1927)

We, J. J. Cowie, of the Fisheries Department, Ottawa, and G. R. Earl, of Yarmouth, N.S., having been duly appointed to represent Canada on the Imperial Economic Committee during its inquiry into the fisheries resources of the Empire with a view to discovering a means by which the marketing of fish produced within the Empire may be promoted in Great Britain, proceeded to London and attended the meetings of the committee throughout the month of June and the first half of July last.

The committee's report has now been published. In addition to the reasoned conclusions and recommendations of the committee, it contains a vast amount of information of a very valuable kind. We, therefore, leave the report to speak for itself, and give herein a summarized account of the information and evidence furnished to the committee by us, from the point of view of Canada. We also incorporate in this report the results of personal inquiries carried on amongst the fish trade of Great Britain, with particular regard to the possibilities of profitably shipping fresh fish from Canada to the markets of that country.

## CANADA'S FISHERY RESOURCES

We, in the first place, submitted a lengthy memorandum describing the various individual fisheries and the methods by which each is prosecuted on the Atlantic coast, in the interior lakes, and on the Pacific coast of Canada. Copies of this memorandum were distributed to the members of the committee for their information and guidance. It should be noted that the committee confined its attention to fish and fish products which enter largely into the food of the people of Great Britain.

## THE NEED OF EXTENDED MARKETING

In our evidence before the committee, it was emphasized that while Canada's fishing population is relatively large, the total population is comparatively small and widely separated; that the Canadian market, therefore, only consumes a fraction of the total production of Canadian fish and that the great bulk of it has to find a market outside the boundaries of Canada in either a fresh, salted, or canned condition. It was further pointed out that the effect of the present high tariff against Canadian fish entering the United States has been not only to make it difficult—if not almost impossible—to continue profitably to ship certain kinds of fish to that country, but to cause our young fishermen to seek more remunerative employment in fishing vessels of the United States, where many of them settle and are definitely lost as citizens of Canada and the Empire.

It was impressed on the committee that we were already not seeking to injure the British fishing industry by adding to the competition it has to meet from foreign importations, but that we did feel that there might be some means found by which the very large British importations of fresh fish from Norway, Germany, and Denmark could be displaced by fresh fish from the Maritime Provinces of Canada, to the end that our fishermen might be retained therein and profitably employed.

## POSSIBILITIES OF RELIEVING CANADIAN SITUATION

It was pointed out there are two ways by which the situation in Eastern Canada could be improved: One is by the shipment of fresh fish in ice to the British market. The committee was informed that it had been clearly demonstrated that such fish can be landed overseas in excellent condition but that transportation difficulties retard development until the volume of the traffic, by some means, has grown sufficiently to overcome them of itself. The other is by freezing the fish under the quick process known as brine freezing which leaves the fish, when defrosted, with all the original juices it contained when taken from the sea. It was pointed out that the Canadian fishing grounds were so near the shore in many places as to make possible the landing of fish almost alive, and, if frozen, could be placed on the British markets in a much better and fresher state than most of the so-called fresh fish landed there direct from the fishing grounds.

The committee was further informed that the marketing of brine frozen fish would have this great advantage: the fish need not be dumped on an over-supplied market, but could be held in storage until the markets had recovered and prices had risen.

The adoption of this means of marketing by the British trade, as well as the Canadian trade, would stabilize supply, demand and prices and push out the existing antiquated method of hurrying fresh fish to market and selling them immediately, whether the supply is such as to constitute a glut or a scarcity.

## CANNED SALMON

On the strength of a memorandum dealing with the marketing of cans of salmon for sale in Great Britain, which was submitted to the committee two years ago and which we were called upon to bring up to date, the committee was instrumental in securing an amendment to the British Merchandise Marks Act last year, which calls for the country of origin to be shown on the can or label when the goods are exposed for sale.

By this means, the British consumer will be enabled to select Empire canned salmon in preference to the foreign product. It has to be noted, however, that this is in the nature of a two-edged weapon and unless British Columbia packers scrupulously maintain a high standard of quality, the name Canada on a can of salmon may work to their disadvantage. The effect of the amended marking act is meantime being closely followed.

With a view to having the information passed on to the Empire Marketing Board, we drew the committee's attention to three cases of evident unfair marketing. Such canned salmon from three British dealers were found to be on sale in Calcutta, India, as well as in England. In the one case the label simply named the contents as "Fresh Salmon". There was nothing to show whether the fish were sockeye or chums, and nothing to indicate whether the fish were canned in Siberia or Canada. In the second case the Union Jack was prominently displayed on the label, no doubt to give the impression that the contents were produced within the Empire, but in very small letters appeared the legend "Product of Siberia". In the third case the contents were designated "Salmon Steak". No doubt all three consisted of cheap Siberian salmon, which, under an Imperial masquerade, were being sold at a British Columbia sockeye price.

## SCIENTIFIC RESEARCH

The committee was informed in a full manner of what is being accomplished in research work in Canada, through the agency of the Marine Biological Board. It was explained that a biological station is maintained at St. Andrews, N.B., where scientists from the various universities carry on marine research during

the summer months, which is followed up later at their respective universities; that an experimental station had been established at Halifax, N.S., within the last two years for applying the scientific knowledge obtained to the practical work of the industry; that two similar stations were maintained on the Pacific coast, and that research work was also being carried on in the inland lake waters.

As an example of what is being done towards applying scientific knowledge to commercial practice, it was pointed out that a small plant is nearing completion at the Halifax station for the purpose of testing and demonstrating the economic value of the adoption of brine freezing for storing and marketing fresh fish, and that similar work is being undertaken at our Prince Rupert station.

In this connection, it is highly gratifying to find that the committee's principal recommendation is in effect what we suggested and what we are now doing at our experimental stations: That, as the prime essential in improved marketing of fresh fish lies in preserving it in the best condition for sale when and where markets are suitable, and that co-ordinated research such as we are already conducting at Halifax be started on both sides of the Atlantic with a view to determining the best means of preservation.

In addition to the formal evidence given to the committee by us, we had the opportunity of going more fully into the details connected with our fish marketing problems when the committee's report was being drafted and discussed.

#### PERSONAL INVESTIGATIONS

In the intervals between the various meetings of the committee, we frequently visited Billingsgate market; we also visited the markets of Grimsby, Liverpool, and Fleetwood, saw the conditions at first-hand and studied prices and methods of distribution.

In general, we found conditions to be still such as were described by Mr. Cowie in his pamphlet "New Markets for Canadian Fish", covering the result of his investigation of two years ago.

We confirmed the conclusions then reached by him, that there is room in the British market for considerable supplies of fresh fish in ice, such as haddock mainly, of flat fish, also skate wings of the right size and kind, and possibly some cod, during the fall and winter months when bad weather interferes with fishing operations over there and prices are frequently high. Remunerative trading even at that time of the year, however, will depend altogether on the sending of moderate supplies to begin with, of fish of the freshest quality and of the sizes required in packages to suit the established trade.

We found that for haddock, flat fish and skate, the desirable box would be 27 inches long, 15 inches wide and 9 inches deep, inside measurement of half inch for the sides and three quarters inch for the ends, with two thin wire straps round each end to give support. A box of this size contains 6 stones or 84 pounds of fish besides the necessary ice. It is very advisable, however, to add a few pounds more at the time of original packing to allow for some shrinkage in weight. In the event of fairly large cod being shipped, the use of a box measuring inside 30 inches long 18 inches wide, and 9½ inches deep would be advisable.

Each of the following sizes of haddock should be packed separately: one and a half to two pounds; over two and up to three and a half pounds; and over three and a half pounds; all with the head on including the gills but with the guts removed. Cod should be packed separately in sizes of ten to fourteen pounds, and of over fourteen pounds with the head on including gills but with the guts removed. Skate wings of medium size are most desirable, and those with white bellies known in the trade as "roker" bring the best price. These could be shipped in haddock boxes.

Shipments of fresh fish in ice from Canada would have to be sent on consignment, and as the price in that, as in any consignment market, is determined not only by the supply and the demand on any particular day, but by the condition and size of the fish, the suitability and weight of the package and the nature of the packing, we cannot do better here than repeat and emphasize what was said in Mr. Cowie's pamphlet above referred to, viz.: "If this business is to be sought after in earnest, I would warn you against the danger of each shipper setting out to do as he pleases. Unsatisfactory shipments at the beginning, may wreck the possibilities of a great trade for many years. The business should be undertaken, therefore, in a systematic way. While any individual shipper is free to ship his fish overseas, there should be for the protection of all, and in order to secure and conserve this business which is of interest to the country as a whole, some sort of organized supervision of the shipments to insure uniformity in size and kind of package, in weight and quality of fish and in the method of packing and icing also to regulate shipments from this side and their distribution on the other side, in order, as far as possible, to avoid well supplied market days."

In other words, shippers should co-operate to the extent of having all shipments made up and forwarded under the supervision and control of a shipping committee or of a shipping committee in each district where two or more shippers desire to test this overseas market.

The opening up of this market would be of far reaching benefit to our shore fishermen particularly who produce fish of the more desirable quality. But as there are shipping difficulties to be overcome and as risks of loss would have to be undertaken in the beginning we would commend to the consideration of the department, the matter of giving to shippers financial aid of some kind during the few initial months to overcome discouragements that may arise from consignments arriving on unremunerative market days, and to enable them to hold on and continue until the trade has obtained a sufficient foothold to take care of itself.

While we feel that there is at present room for such a trade during the season indicated above, we at the same time strongly feel that if and when the shipment of brine frozen fish with all the advantages derivable from the storable quality of such can be developed, the benefits flowing therefrom would be immensely greater than under existing conditions, because the demand for and the price of fresh fish in summer would then be equal to what it is now in the fall and winter.

### CANNED FISH

We further looked into the possibility of increasing our fish exports by the development of a trade in canned fish other than salmon and lobsters, and feel that there is room for such, particularly special lines of our Atlantic sea fish prepared in this way. But any development along this line would call for concentrated and sustained effort to find an opening.

### BY-PRODUCTS AND UNUSED FISH

We looked closely into the question of the utilization of fish offal and fish that for various reasons are unmarketable in Great Britain, and we have reached the conclusion that there is a great and ever-widening market for fish meal of the desired quality produced from such.

The initial cost of the machinery for meal making is very considerable. While efforts are being, at present, made to a limited degree to utilize the waste from steam trawler fishing in Canada, the great field covered by our shore fishermen along the Atlantic coast lies, as yet, untouched.

When we consider the great economic benefit now derived by raisers of cattle and pigs by reason of the fact that every scrap of what was at one time waste material is utilized in the manufacture of some by-product, the marketing of which has enhanced the value of such animals, and when we know that there is an unsatisfied market-hunger for the right quality of meal from fish waste, we feel that the throwing away of 30 per cent of the large quantities of fresh fish brought to land by our shore fishermen is a serious economic loss, which might readily be avoided.

There are machines now capable of extracting a sufficient quantity of the oil from such fish as dogfish and leaving a high-class meal fit for animal and poultry feeding. If, then, fish-meal-making plants at which dogfish could be used as well as the waste from cod and haddock and such like non-oily fish were in operation at several centres to which material could be taken from stretches of coast on either side, it would be a very great inducement to fishermen to increase their fishing and earning power.

It is well known that at present when dogfish come on the coast, fishermen practically stop operations rather than continue hauling their lines loaded up with these fish and with very few or none of the food fishes. But, if the shore fishermen were once assured that they could dispose of every dogfish and every other non-edible fish at a price to a meal-making plant, in addition to the benefit they would derive from the increased quantity of edible fish they would then bring to land, their outlook and material state would quickly change.

We strongly feel that the establishment of central meal-making plants on the Atlantic coast is of as much importance as the finding of new markets for fish as a means of rebuilding our fishing fleets and retaining our fishermen. If, therefore, firms of standing engaged in the fisheries could be induced and encouraged to take hold of this means of development, there would appear to be no room for doubt that a shore fishery greater than has yet been on the Atlantic coast would quickly emerge from its present low unprofitable state.

To summarize, in conclusion, the main features of the foregoing report, which in our opinion would bring immediate beneficial results to the fishing industry of our Maritime Provinces, we would note that these are two, namely:—

1. The marketing of fresh fish in ice in Great Britain and
2. The establishment of meal-making plants to take care of the great amount of material at present being wasted.

## APPENDIX NO. 11

## REPORT ON THE FISHERIES OF THE MACKENZIE RIVER DELTA

Inspector V. A. M. KEMP, R.C.M.P.

Pacific salmon have not been seen about the mouth of the MacKenzie, or along this portion of the Arctic coast, as far as is known to the R.C.M. Police or from inquiries among the natives.

A species of salmon, variously called "Arctic Trout" and "Salmon Trout," is found in the salt waters around the coast, but as the water for some distance around the mouth of the MacKenzie and east and west along the coast for a radius of twenty or thirty miles, is fresh these are not found in the immediate vicinity of the Delta. The salmon trout referred to are of a dark green colour with light coloured bellies, and their weight runs from about two to six pounds. The meat is very similar to Pacific salmon both as to colour and taste. These fish are speckled reminding one somewhat of the speckled trout found in the rivers in the eastern part of Canada.

Apart from these salmon trout the other salt water fish found on the coast are herring and tom cod. The herring are the most numerous fish on the coast and as they are entirely similar to their brethren met with elsewhere in salt water fisheries, I will not describe them. The tom cod is a small fish from four to eight inches in length, and is found in the waters after freeze up begins, as the natives catch them by jigging through the ice. They are rather tasteless as to meat, and in view of their diminutive size, it takes a considerable catch, to make a satisfactory meal particularly for the natives to whom fish is one of the main foods. Whether these fish migrate when the severe winter sets in I am unable to state.

In the fresh waters of the Delta, the fish caught are white fish, jack fish, loche, crooked backs and conie. The first three named are fairly numerous, as are also the crooked backs. The conie is not so frequently met with as the others, but owing to its bulk, a considerable amount of the meat is secured. The conie weighs up to thirty and forty pounds, and Stefanson, who traces the origin of the name to the French "L'inconnu" states he has heard of them reaching as high as seventy pounds, although the largest he saw weighed forty pounds. He also states that this fish used to be called MacKenzie river salmon, although it bears no resemblance to the usual variety of salmon.

The two best places for fishing in the district appear to be Shingle Point and Kittagaruit. The former place is for salt water fishing and herring are the most common fish caught there. At Kittagaruit, just below the mouth of the river, the water is fresh, and white fish, crooked backs and conie are found there.

As marine animals are included in the definition of "fish" according to the Fisheries Act, I might mention that white whales are fairly numerous around the mouth of the Mackenzie river. At White Fish Station, some eight miles from Moose river, the most Westerly outlet of the MacKenzie, these white whales are fairly plentiful, and the natives hunt them at this place, which owes its name to the whale in question, the native name for it being "White Fish." It is highly prized by the Eskimos who eat the flesh and use the skin for water proof boots.

Bow-head whales are rarely seen in the waters close to the coast, and I believe it is some years since one was seen close to Herschel island. One is occasionally sighted off Baillie island, but they are by no means common even in those parts.

Hair seals are of course fairly numerous, and are much sought by the natives, who use the skins for clothing and the meat for food.

The above report covers the various species of fish found in salt and fresh waters in the vicinity of the MacKenzie Delta.





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